NOISE ASSESSMENT

Ocotillo Wells Solar Project
(APN 253-390-57), (APN 253-290-58)
MUP 3300-12-004, ER 3910-12-12-001

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GLOSSARY OF TERMS

Sound Pressure Level (SPL): a ratio of one sound pressure to a reference pressure (L_{ref}) of 20 µPa. Because of the dynamic range of the human ear, the ratio is calculated logarithmically by 20 log (L/L_{ref}).

A-weighted Sound Pressure Level (dBA): Some frequencies of noise are more noticeable than others. To compensate for this fact, different sound frequencies are weighted more.

Minimum Sound Level (L_{min}): Minimum SPL or the lowest SPL measured over the time interval using the A-weighted network and slow time weighting.

Maximum Sound Level (L_{max}): Maximum SPL or the highest SPL measured over the time interval the A-weighted network and slow time weighting.

Equivalent sound level (L_{eq}): the true equivalent sound level measured over the run time. Leq is the A-weighted steady sound level that contains the same total acoustical energy as the actual fluctuating sound level.

Day Night Sound Level (Ldn): Representing the Day/Night sound level, this measurement is a 24 –hour average sound level where 10 dB is added to all the readings that occur between 10 pm and 7 am. This is primarily used in community noise regulations where there is a 10 dB "Penalty" for night time noise. Typically Ldn's are measured using A weighting.

Community Noise Exposure Level (CNEL): The accumulated exposure to sound measured in a 24-hour sampling interval and artificially boosted during certain hours. For CNEL, samples taken between 7 pm and 10 pm are boosted by 5 dB; samples taken between 10 pm and 7 am are boosted by 10 dB.

Octave Band: An octave band is defined as a frequency band whose upper band-edge frequency is twice the lower band frequency.

Third-Octave Band: A third-octave band is defined as a frequency band whose upper band-edge frequency is 1.26 times the lower band frequency.

Response Time (F,S,I): The response time is a standardized exponential time weighting of the input signal according to fast (F), slow (S) or impulse (I) time response relationships. Time response can be described with a time constant. The time constants for fast, slow and impulse responses are 1.0 seconds, 0.125 seconds and 0.35 milliseconds, respectively.

EXECUTIVE SUMMARY

This noise study has been completed to determine the noise impacts associated with the development of the proposed Ocotillo Wells Solar Project located on a two parcels totaling approximately 440 gross acres. The Project is located in the unincorporated community of Ocotillo Wells in eastern portion of San Diego County, CA.

Based on the empirical data, the manufactures specifications, and the distances to the property lines, the unshielded cumulative noise levels from the proposed transformers/inverters and the onsite Substation and back-up generators were found to be below the most restrictive nighttime property line (zoned S-92) standard of 45 dBA at all property lines for all of the proposed site configurations and solar technologies. No impacts are anticipated and no mitigation is required.

The measured Corona Affect noise levels associated with the existing transmission lines were found to be below the County of San Diego's most restrictive nighttime standard of 45 dBA. No impacts from the Corona Affect are anticipated from the transmission lines near the proposed Project.

At a distance as close as 165 feet, the point source noise attenuation from the grading activities and the nearest property line is -10.4 dBA. This would result in an anticipated worst case eight-hour average combined noise level of 74.9 dBA at the property line. During the installation of the solar panels, a noise level of 74.9 dBA would result at a distance of 275 feet. The installation equipment is anticipated to average a distance of more than 300 feet from the nearest property line. Given this and the spatial separation of the equipment over the large site area, the noise levels of the grading and panel installation are anticipated to comply with the County of San Diego's 75 dBA standard at all Project property lines.

Additionally, the County Noise Ordinance Section 36.410, states that no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown of 82 dBA (at residential uses), when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period. To reduce the maximum noise level of 95 dBA to 82 dBA the pile driver would need to be located 215 feet from the nearest occupied residential property line or only operate 25% of the hourly or daily duration (15 minutes of any hour and 2 hours of a 8 hour work day) when located within that distance. Based on these duration and distance parameters the impulsive noise levels are anticipated to be below the County's most restrictive 82 dBA threshold and no impacts are anticipated and no mitigation measures are required. Currently, none of the adjacent properties have existing occupied structures and therefore are exempt from the Noise Ordinance Sections 36.408-36.410. If properties become occupied prior to or during the construction of the Project then a 215 foot setback for the pile drivers or a 25% time restriction would apply.

1.0 INTRODUCTION

This noise study was completed to determine the noise impacts associated with the development of the proposed Ocotillo Wells Solar Project. The Project is located at 33°03' 58" N and 116° 05' 12" W, near the town of Ocotillo Wells in eastern San Diego County adjacent to Imperial County. The general location of the Project is shown on the Vicinity Map, Figure 1-A.

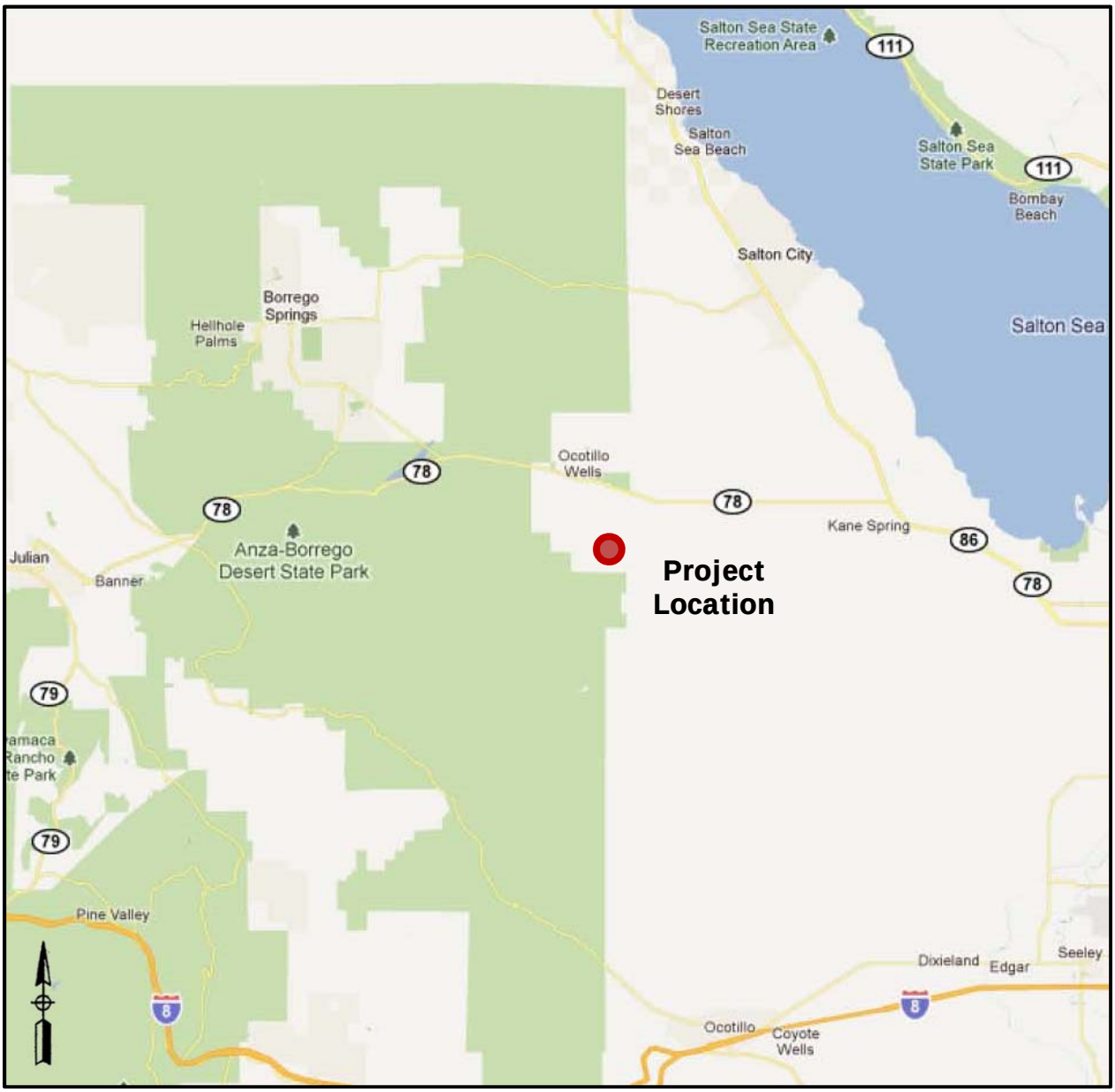
1.1 Project Description

The Project proponent is preparing an application for development and operation of a photovoltaic (PV) or concentrated photovoltaic (CPV) solar Project to be located on privately-held lands near Ocotillo Wells. The Project would require approval from the County of San Diego for a Major Use Permit (MUP) to allow for the construction, operation, and maintenance of such facilities for the long-term generation of clean renewable energy from solar power.

The County Assessor Parcel Numbers (APNs) that comprise the Project area for the main facilities are 253-390-57 and 253-390-58, totaling 440 acres (approximately 280 acres and 160 acres, respectively); however, the proposed Project development footprint would total approximately 338.1 acres. The development footprint for the Project includes approximately 336.4 acres of the 440 acres, plus approximately 1.74 acres of disturbance for offsite improvements for access purposes (access road/easement from Split Mountain Road). The remaining 103.6 acres on the two affected parcels would remain in their natural state. Gildred Building Co., LLC currently owns APN 253-390-57 and APN 253-390-58. The Project site configuration and general layout is provided in Figure 1-B on Page 3.

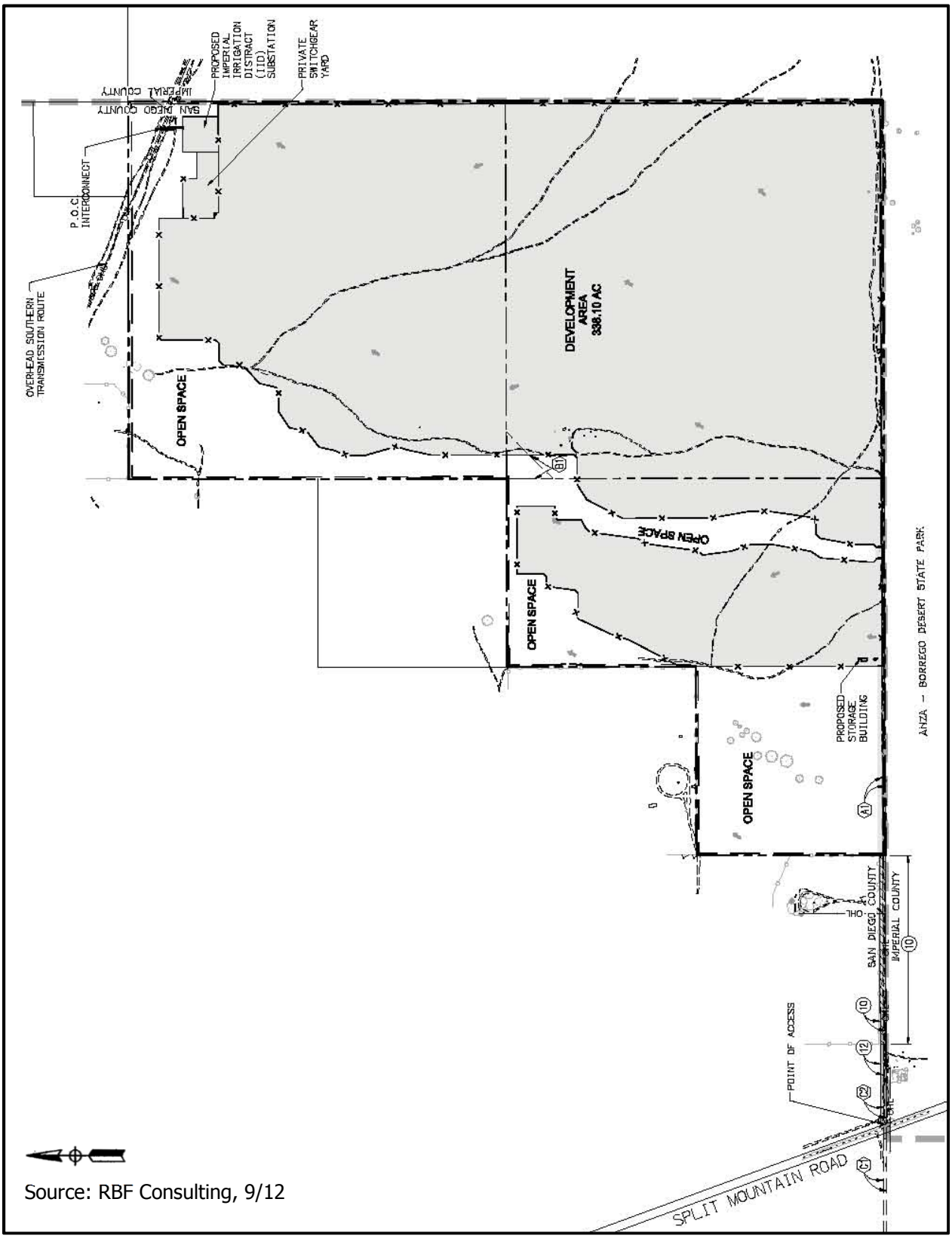
To allow for flexibility in the ultimate type of technology utilized for construction of the solar Project, four variations of PV and CPV alternative technology systems are being considered by the Project applicant. The proposed development footprint would remain the same with any of the technology scenarios selected. In addition to the solar panels, development would include construction of two 10,000-gallon water storage tanks and an operations/maintenance building (approximately 1,040 s.f., height of 15-16 feet). Additionally, a substation (development footprint of approximately 62,500 s.f.) that would be dedicated to the Imperial Irrigation District (IID) and a private switchgear yard (development footprint of approximately 96,750 square feet, maximum height of 35 feet) with a control house are proposed; however, only a limited portion of these areas would support physical structures. The Dual-Axis Tracker System and the Dual-Axis Tracker Units, as described in detail below, would also require installation of six 125kW emergency generators located on a 12-foot by 20-foot concrete pad within the interior of the development area to enable the solar panels to be rotated to the stow position, in the event that power from the local utility is lost or when high winds occur.

Figure 1-A: Project Vicinity Map



Source: Google Maps, 9/11

Figure 1-B: Overall Project Layout



Source: RBF Consulting, 9/12

The energy generated by the Project with any of the four alternative technology systems would be transmitted via a central overhead 34kV collection line to the substation proposed in the northeast corner of the site, adjacent to an existing 92 kilovolt (kV) "R-Line" that runs through the northeastern corner of the affected parcel. The solar Project is proposed to be connected to the R-Line with an interconnection agreement with the IID. The R-Line runs aboveground and ultimately connects to the existing San Felipe Substation, located approximately 2.1 miles to the northwest of the point of interconnection.

Each of the four layouts would also require construction of a number of equipment pads to support small enclosures to house the associated inverters/transformers/switching gear. The total number of required equipment pads within the development footprint, as well as the combination of components that each would support (e.g. either transformers/inverters or breakers/transformers), would vary based upon the technology system selected.

The ultimate arrangement/number of solar panels, equipment pads and structures, and internal access roads are shown on the MUP Plot Plans prepared specific to each of the proposed solar technology systems; however, each of these layouts are subject to modification at final engineering design. Each of the four solar technology systems being considered is described in brief below.

Fixed-Axis Rack System

The Fixed-Axis Rack System would have an anticipated production capacity of approximately 42 MW (alternating current - AC). The Project design would consist of a series of PV solar panels on a fixed-axis rack system, installed on rack pilings of 4-6 inch diameter metal I-beams or 4-inch diameter round pipe.

The solar panels would be oriented along an east-west axis with the panels generally facing to the south to maximize solar absorption during the hours of daylight. The panels would be rack-mounted in a two-panel system (one panel mounted above a second panel). Panels (rack system) would measure approximately nine feet wide and approximately 51 feet in length, with a maximum of 10 feet in height, as measured from ground surface to the top of the panel.

Spacing between each row along the north/south axis would measure approximately 19 feet center to center. It's estimated that up to 42 individual equipment pads (approximately 15 feet by 40 feet, or 600 square feet in size) would be constructed within the solar array field to support the required inverters/transformers.

A series of north-south and/or east-west running all-weather fire access roads, of minimum 24-foot width and unsurfaced (covered with a binding agent), would be provided to meet design requirements of the San Diego County Fire Authority. These roads would also serve for

purposes of maintenance.

Single-Axis Rack System

The Single-Axis Rack System would have an anticipated production capacity of up to 50 MW (alternating current). The Project design would consist of a series of single-axis tracking PV solar panels supported on driven pier footings.

The solar panels would be aligned in north/south rows and would face to the east in the morning and to the west in the evening hours, tracking the sun along the vertical axis to maximize solar absorption during the hours of daylight. The panels would be rack-mounted, measuring approximately seven feet in width and 90 feet in length (panel array), with a maximum height of 9.5 feet, as measured from the ground surface to the top of the panel.

Spacing between each row along the north/south axis would be approximately 17 feet center to center. It's estimated that up to 43 individual equipment pads (approximately 15 feet by 40 feet, or 600 square feet in size) would be constructed within the solar array field to support the required inverters/transformers.

A series of north-south and/or east-west running all-weather fire access roads, of minimum 24-foot width and unsurfaced (covered with a binding agent), would be provided per design requirements of the San Diego County Fire Authority. Additionally, a series of 24-foot wide unsurfaced roads would be provided within the solar field for purposes of maintenance.

Dual-Axis Rack System

The Dual-Axis Rack System would have an anticipated production capacity of approximately 45 MW (alternating current). The Project design would consist of a series of CPV solar panels installed on a dual-axis rack system. The solar arrays would be constructed on pile-driven pier footings.

The solar panels would be aligned in rows running along a north-south axis and would rotate to face the east in the morning and the west in the evening hours, tracking the sun along the vertical and horizontal axes to maximize solar absorption during the hours of daylight. As a dual-axis system, the panels could also be rotated along the north-south axis to change the angle of the panel, depending on the time of year, in order to maximize the absorption of sunlight.

Each row would contain a system of up to four arrays. Each array of panels would support a grouping of eight "paddles," with each paddle supporting eight modules of solar collectors. Each array would measure approximately 18.5 feet in width and 80 feet in length (panel array). The total height of the arrays would be approximately 23 feet in height, as measured from ground

surface to the top of the panel.

Spacing between each row along the east-west axis would be approximately 53 feet center to center. An estimated 46 individual equipment pads (approximately 15 feet by 40 feet, or 600 square feet in size) would be constructed within the solar array field to support the breakers/transformers. Additionally, construction would include installation of six 125kW emergency generators (each located on a 12-foot by 20-foot building pad) to provide a reserve source of power in the case of power failure. The generators would provide energy to rotate the tracker units to the stow position in the event of an emergency or high winds.

A series of east-west running all-weather fire access roads, of minimum 24-foot width and unsurfaced (covered with a binding agent), would be provided approximately every 330 feet between the horizontal rows of panels, per design requirements of the San Diego County Fire Authority. Additionally, a series of unsurfaced roads would be provided within the solar field for purposes of maintenance.

Dual-Axis Tracker Units

The Dual-Axis Tracker Units would have an anticipated production capacity of approximately 54 MW (alternating current). The Project design would consist of series of CPV solar trackers installed on driven 24 inch to 30 inch pier footings/concrete foundation system.

The CPV trackers would be aligned in north/south rows and would face to the east in the morning and to the west in the evening hours, tracking the sun along both the horizontal and vertical axes to maximize solar absorption during the hours of daylight. Each tracker would measure approximately 25 feet wide and 48 feet in length, with a maximum height of 30 feet, as measured from ground surface to the top of the unit.

The series of CPV trackers would be spaced approximately 82 feet on-center east/west, and 69 feet on-center north/south. An estimated 40 individual equipment pads (approximately 15 feet by 40 feet, or 600 square feet in size) would be constructed within the solar array field to support the required inverters/transformers. Additionally, construction would include installation of six 125kW emergency generators (each located on a 12-foot by 20-foot building pad) to provide a reserve source of power in the case of power failure. The generators would provide energy to rotate the tracker units to the stow position in the event of an emergency or high winds.

A series of north-south running all-weather fire access roads, of minimum 24-foot width and unsurfaced (covered with a binding agent), would be provided per design requirements of the San Diego County Fire Authority. Additionally, a series of north-south running unsurfaced roads would be provided within the solar field for purposes of maintenance.

1.2 Environmental Settings & Existing Conditions

a) Settings & Locations

The Project would consist of a solar generation project over the two parcels of land for transport of the power generated to an existing R-line with an interconnection agreement with IID. The County Assessor Parcel Numbers (APN) affected by the proposed Project for the main facilities include 253-390-57 & 58 (approximately 440 acres). The main project access will be located at the eastern edge of the site from a private easement road that connects to Split Mountain Road. The zoning for the Project parcel and all surrounding land uses is General Rural (S-92).

b) Existing Noise Conditions

The Project is located east of Split Mountain Road along a private easement road and is currently undeveloped. Split Mountain Road is an unclassified roadway in the County of San Diego's Circulation Element. Existing noise occurs mainly from infrequent vehicular traffic traveling on the adjacent roadway and some air traffic nearby.

1.3 Methodology and Equipment

a) Noise Measuring Methodology and Procedures

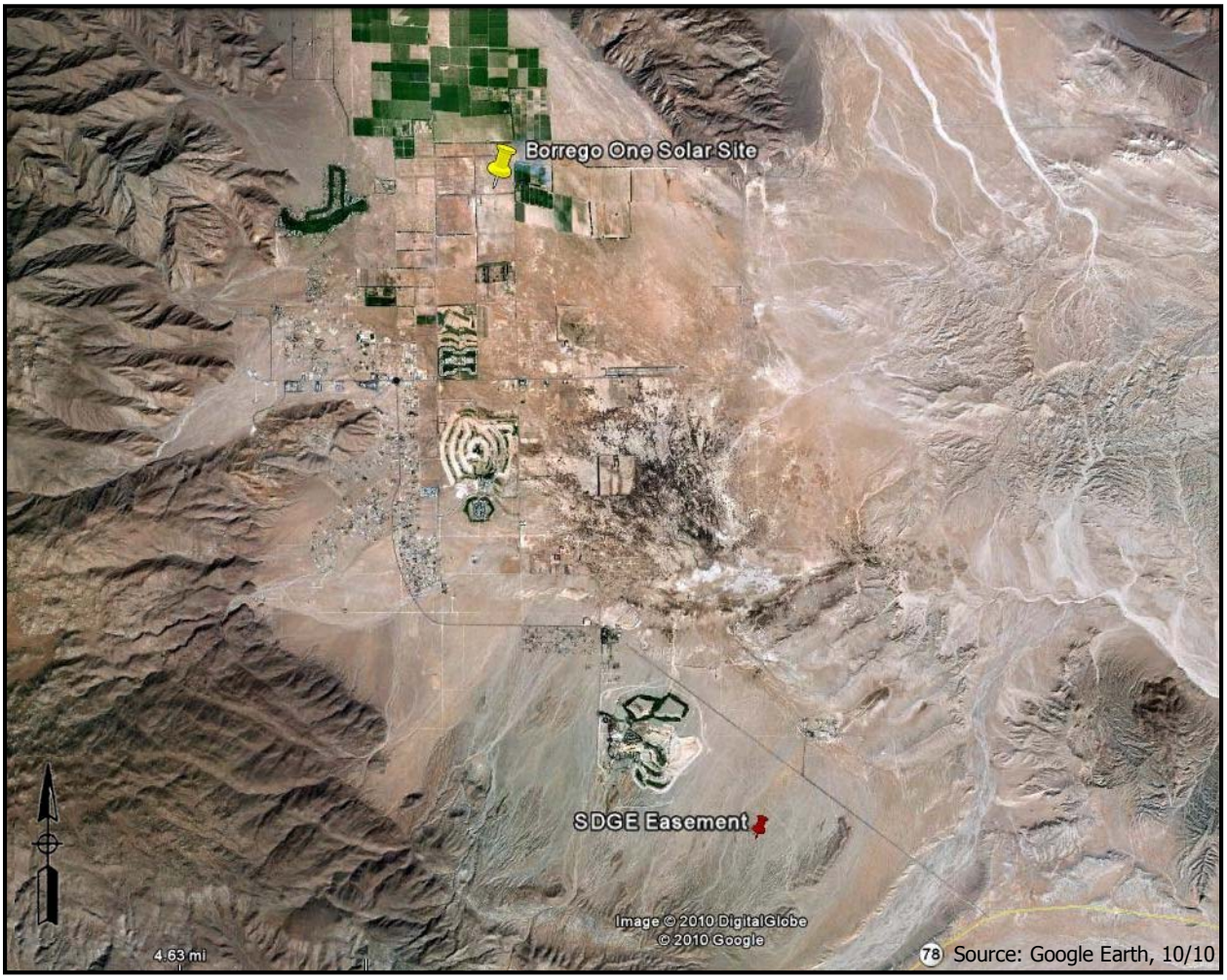
To determine the ambient noise environment and to assess potential noise impacts, measurements of the Corona Affect were taken along an existing SDGE 69 kV transmission line located in the area. This was done to determine the local conditions and to establish a baseline for the Corona Affect. The noise measurements were recorded on December 4, 2009 by Ldn Consulting, Inc. between approximately 9:30 a.m. and 10:00 a.m. in dry, calm and clear conditions. The sound levels for the proposed on-site equipment were taken from the manufacture's specifications.

Noise measurements were taken using a Larson-Davis Model LxT Type 1 precision sound level meter, programmed, in "slow" mode, to record noise levels in "A" weighted form. The LxT was set to record in the low range of -10 to 110 dBA. The sound level meter and microphone were mounted on a tripod, five feet above the ground and equipped with a windscreen during all measurements. The sound level meter was calibrated before and after the monitoring using a Larson-Davis calibrator, Model CAL 200.

The noise measurement location was determined based on site access and low ambient conditions to capture only the potential transmission line noise levels. The 69 kV transmission line measurements were taken mid-span between two power poles along an existing San Diego Gas &

Electric (SDGE) easement. The noise measurement location and relationship to the proposed Project location is provided graphically in Figure 1-C, denoted by the SDGE Easement marker.

Figure 1-C: Corona Affect Noise Measurement Location



b) Noise Calculations and Factors

Noise is defined as unwanted or annoying sound which interferes with or disrupts normal activities. Exposure to high noise levels has been demonstrated to cause hearing loss. The individual human response to environmental noise is based on the sensitivity of that individual, the type of noise that occurs and when the noise occurs.

Sound is measured on a logarithmic scale consisting of sound pressure levels known as a decibel (dB). The sounds heard by humans typically do not consist of a single frequency but of

a broadband of frequencies having different sound pressure levels. The method for evaluating all the frequencies of the sound is to apply an A-weighting to reflect how the human ear responds to the different sound levels at different frequencies. The A-weighted sound level adequately describes the instantaneous noise whereas the equivalent sound level depicted as Leq represents a steady sound level containing the same total acoustical energy as the actual fluctuating sound level over a given time interval.

The Community Noise Equivalent Level (CNEL) is the 24 hour A-weighted average for sound, with corrections for evening and nighttime hours. The corrections require an addition of 5 decibels to sound levels in the evening hours between 7 p.m. and 10 p.m. and an addition of 10 decibels to sound levels at nighttime hours between 10 p.m. and 7 a.m. These additions are made to account for the increased sensitivity during the evening and nighttime hours when sound appears louder.

Because mobile/traffic noise levels are calculated on a logarithmic scale, a doubling of the traffic noise or acoustical energy results in a noise level increase of 3 dBA. Therefore the doubling of the traffic volume, without changing the vehicle speeds or mix ratio, results in a noise increase of 3 dBA. Mobile noise levels radiant in an almost oblique fashion from the source and drop off at a rate of 3 dBA for each doubling of distance under hard site conditions and at a rate of 4.5 dBA for soft site conditions. Hard site conditions consist of concrete, asphalt and hard pack dirt while soft site conditions exist in areas having slight grade changes, landscaped areas and vegetation. On the other hand, fixed/point sources radiate outward uniformly as it travels away from the source. Their sound levels attenuate or drop off at a rate of 6 dBA for each doubling of distance.

The most effective noise reduction methods consist of controlling the noise at the source, blocking the noise transmission with barriers or relocating the receiver. Any or all of these methods could be required to reduce noise levels to an acceptable level.

2.0 OPERATIONAL ACTIVITIES

2.1 Guidelines for the Determination of Significance

Section 36.404 of the County of San Diego noise ordinance provides performance standards and noise control guidelines for determining and mitigating non-transportation, or stationary, noise source impacts to adjacent properties. The purpose of the noise ordinance is to protect, create and maintain an environment free from noise that may jeopardize the health or welfare, or degrade the quality of life.

The County Noise Ordinance states that it shall be unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level, at any point on or beyond the boundaries of the property exceeds the applicable limits provided in Table 2-1.

Table 2-1: Sound Level Limits in Decibels (dBA)

ZONE		APPLICABLE LIMIT ONE-HOUR AVERAGE SOUND LEVEL (DECIBELS)
R-S, R-D, R-R, R-MH, A-70, A-72, S-80, S-81, S-87, S-88, S-90, S-92, R-V, and R-U Use Regulations with a density of less than 11 dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45
R-RO, R-C, R-M, C-30, S-86, R-V, R-U and V5. Use Regulations with a density of 11 or more dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50
S-94, V4, and all other commercial zones.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55
V1, V2 V1, V2 V1 V2	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m. 10 p.m. to 7 a.m.	60 55 55 50
V3	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	70 65
M-50, M-52, M-54	Anytime	70
S-82, M-58, and all other industrial zones.	Anytime	75

Source: County of San Diego Noise Ordinance Section 36.404

As stated above in Section 1, the Project and surrounding properties are zoned General Rural (S-92). Section 36.404 of the Noise Ordinance sets a most restrictive operational exterior noise limit for the S-92 and residential noise sensitive land uses of 50 dBA Leq for daytime hours of 7 a.m. to 10 p.m. and 45 dBA Leq during the noise sensitive nighttime hours of 10 p.m. to 7 a.m. as shown in Table 2-1 above. Most of the Project components will only operate during the daytime hours but a few may operate during nighttime or early morning hours and therefore the most restrictive and conservative approach is to apply the 45 dBA Leq nighttime standard at the property lines.

2.2 Potential Operational Noise Impacts

This section examines the potential stationary noise source impacts associated with the operation of the proposed Ocotillo Wells Solar Project. Specifically, noise levels from the proposed transformers, inverters, a substation and transmission lines. Panels would be electrically connected into panel strings using wiring attached to the racking. Panel strings would be electrically connected to each other via underground wiring. Wire depths would be in accordance with local, State, and Federal codes. Gathering lines would connect individual panel strings to one or more inverters/transformers and combiner boxes distributed throughout the facility. Wiring from the panel strings are connected to combiner boxes. The electrical current is then transferred to the inverters, which convert the Direct Current (DC) produced by the PV or CPV solar panels into Alternating Current (AC). A pad-mounted transformer next to the inverter would increase the voltage. The AC would then travel through underground gathering lines to the Project Substation.

The Project proposes the installation of small-scale, above ground structures that would be located within the solar panel fields to hold the inverter/ transformers. Depending on the final ultimate type of technology utilized these structures may range from 40 up to 46 structures and these structures would be approximately 15 foot by 40 foot in size. Each of these locations will house roughly a 1 MW Commercial Solar Inverter and one of the smaller transformers necessary to increase the voltage. The transformer and inverter locations will be spread out over the site with a transformer and an inverter grouped next to each other. The Project also proposes a project Substation located at the northeast portion of the site. The Project is also proposing back-up 125kW generator(s), dependent on the chosen technology, which will be located near the transformer/inverter locations.

Two basic site configurations are proposed based on the four types of technology that may be utilized as described above. The first configuration includes the dual-axis rack system which includes the CPV type technology and the second configuration includes the remaining three types of technology (fixed panel, single-axis and dual-axis tracker systems) which includes either CPV or PV type technology.

The dual-axis rack system (CPV) will be equipped with a tracker motor to rotate the CPV panels and a blower for moister control. The proposed Xantrex Inverters have a noise level rating of 77 dB at 6 feet (Schneider Electric 2011). There will be a transformer along with each pair of inverters. The proposed transformers have an unshielded noise rating of less than 60 dBA at 5 feet *(Source: National Electric Manufactures Association (NEMA) Publication No. TR 1-1993)*. The noise levels from the proposed CPV tracker motors and blowers combined was found to be 38 dBA at 50 feet *(Source: Empirical data collected for the Rugged Solar Project – AECOM, September 30, 2011).* Based on several manufacture's specifications the 100-125 kW back-up generators have a noise level of 68-71 dBA at 23 feet *(Source: Kohler Power, 2012).* The proposed inverter/transformer locations, generators and the Substation location for this Project configuration can be seen in Figure 2-A on the following page.

The remaining solar site configurations (fixed panel, single-axis and dual-axis tracker systems) would have the inverter/transformers locations are generally in the same location along with the Substation. Only the dual axis configuration will require back-up generators similar to the CPV layout. Therefore, the worst case noise levels base on these three types of technology would be associated with the dual-axis tracker systems because of the tracker motors and generators. The fixed panels would have less noise sources.

Therefore, the dual-axis system is analyzed to determine compliance with the County's property line standards. These proposed technologies would utilized either a Satcon PowerGate Plus 1 MW Commercial Solar Inverter, or a SMA Cunny Central Inverter, or equivalent. The Satcon Inverter has an unshielded noise rating of less than 65 dBA at 5 feet *(Source: Satcon PowerGate Specifications, 2009)*. The SMA Inverter has an unshielded noise rating of 68 dBA or less per the NEMA TR-1 specifications. Therefore, the higher noise level of 68 dBA from the SMA Inverter was utilized. The array tracker motors were found to have a cumulative noise level of 39 dBA at a distance of 100 feet *(Source: Nellis Solar Power Plant Noise Measurements - JBA Consulting Engineers, 2010).* The proposed inverter / transformer locations and the Substation location for the dual-axis system configuration can be seen in Figure 2-B on Page 14.

The electric power produced by the Project will be feed into the existing R-Line with an interconnection agreement with the Imperial Irrigation District (IID). The operational noise levels from the proposed on site small-scale inverter/transformer buildings along with the Substation equipment and the offsite Corona Affect are analyzed separately below for the two worst case Project configuration as described above.

Figure 2-A: Proposed Equipment Locations (Dual-Axis Rack System)

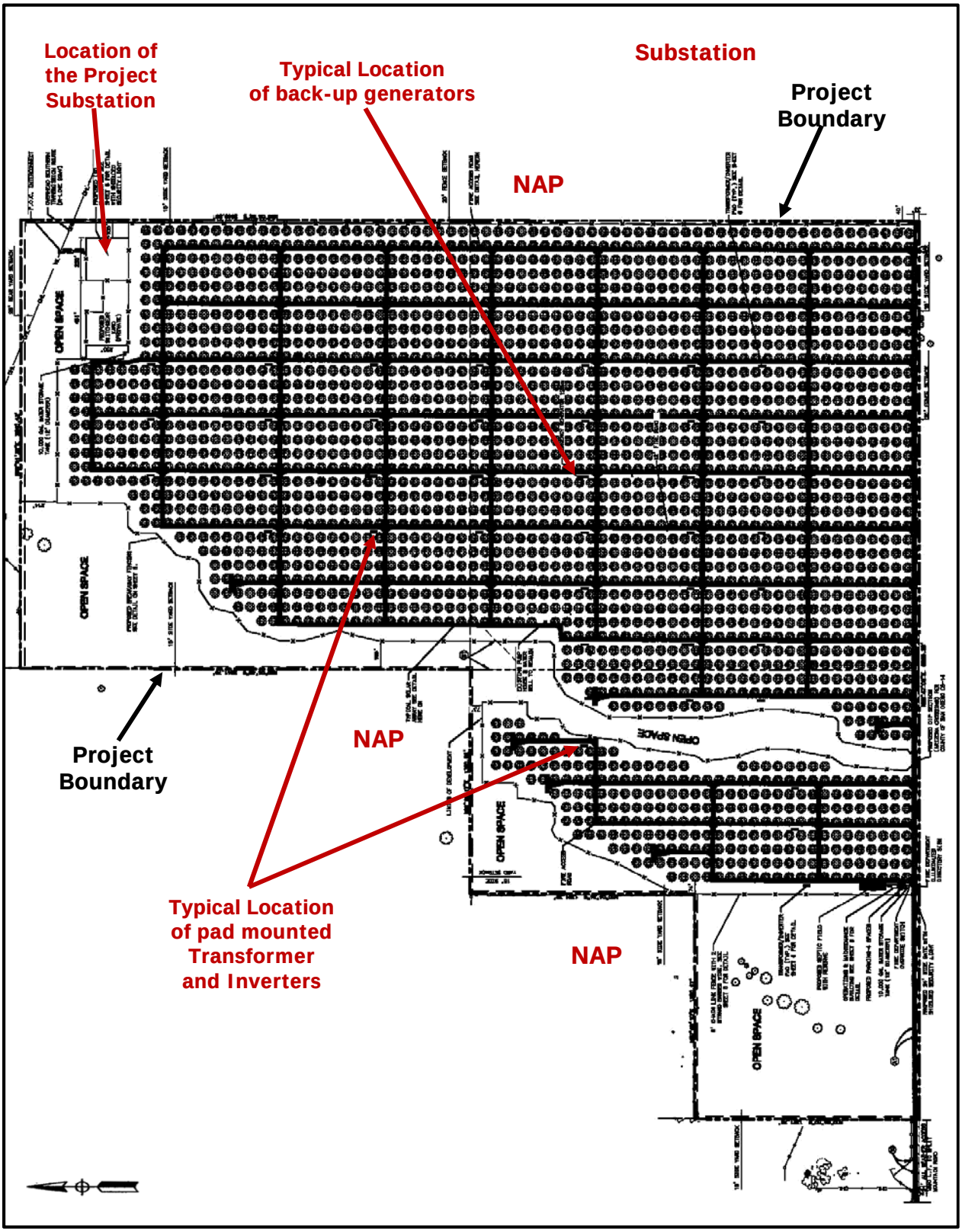
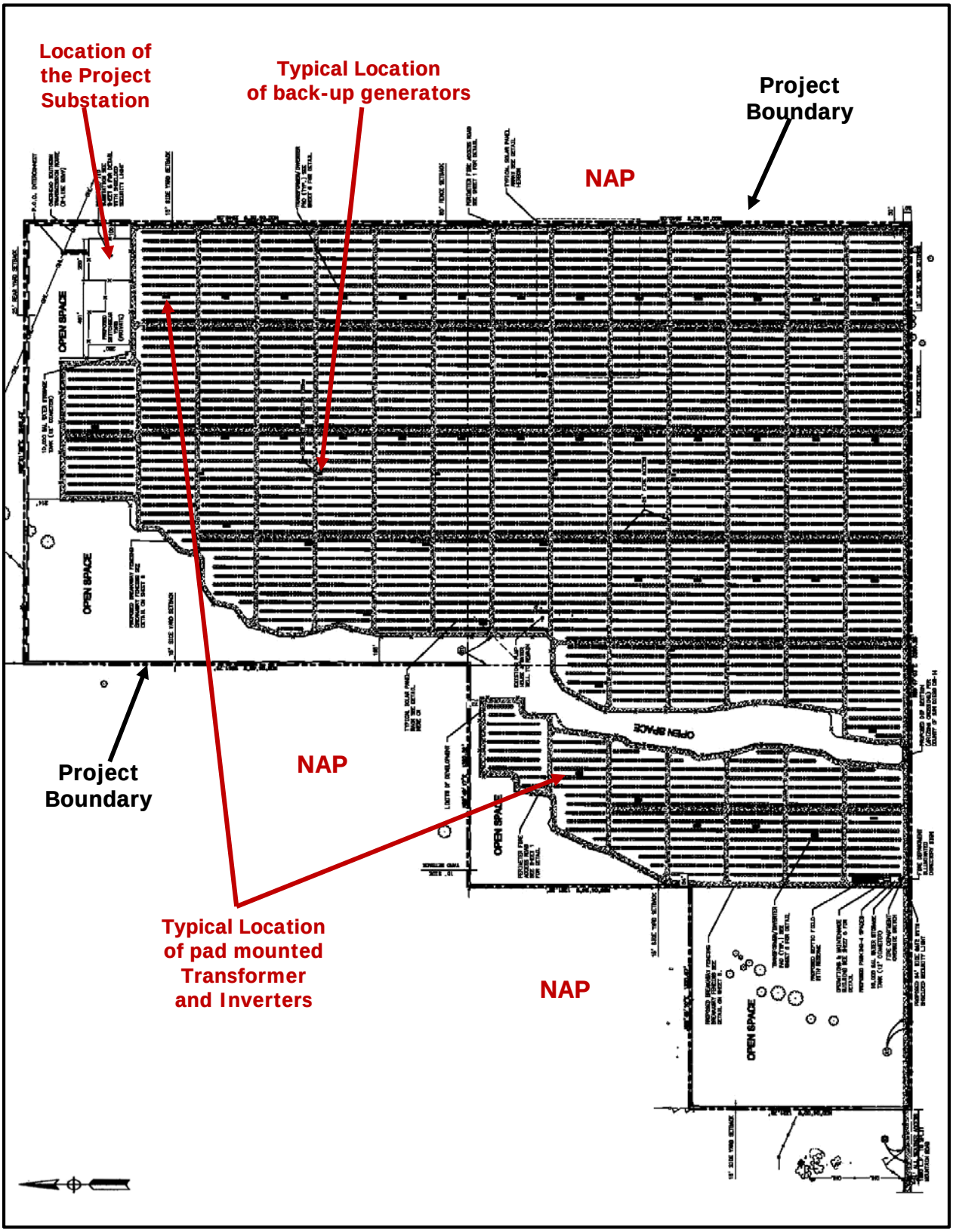


Figure 2-B: Proposed Equipment Locations (Dual-Axis Tacking System)



2.2.1 Operational Noise Levels On-site

Dual-Axis Rack System (CPV)

As described above, the proposed Xantrex Inverters have a noise level rating of 77 dB at 6 feet (Schneider Electric 2011). There will be a transformer along with each pair of inverters. The proposed transformers have an unshielded noise rating of less than 60 dBA at 5 feet *(Source: National Electric Manufactures Association (NEMA) Publication No. TR 1-1993)*. The NEMA test results for the transformers and manufacturer's specifications for an equivalent inverter are provided in ***Attachment A***.

The noise levels from the proposed CPV tracker motors and blowers combined was found to be 38.0 dBA at 50 feet based on empirical data collected for the applicant by AECOM on September 30, 2011. This noise level would be the hourly level if the equipment were to operate for an entire hour. However, the required operation time of the tracker motor is anticipated to operate only 15-20 minutes of any given hour. Additionally, the required operation time of the blower would be dependent on the location (e.g., more humid locations would require more drying time than arid locations). Since the Project site is located in Borrego Springs which is an arid location the blower is anticipated to operate less than 30 minutes of any given hour.

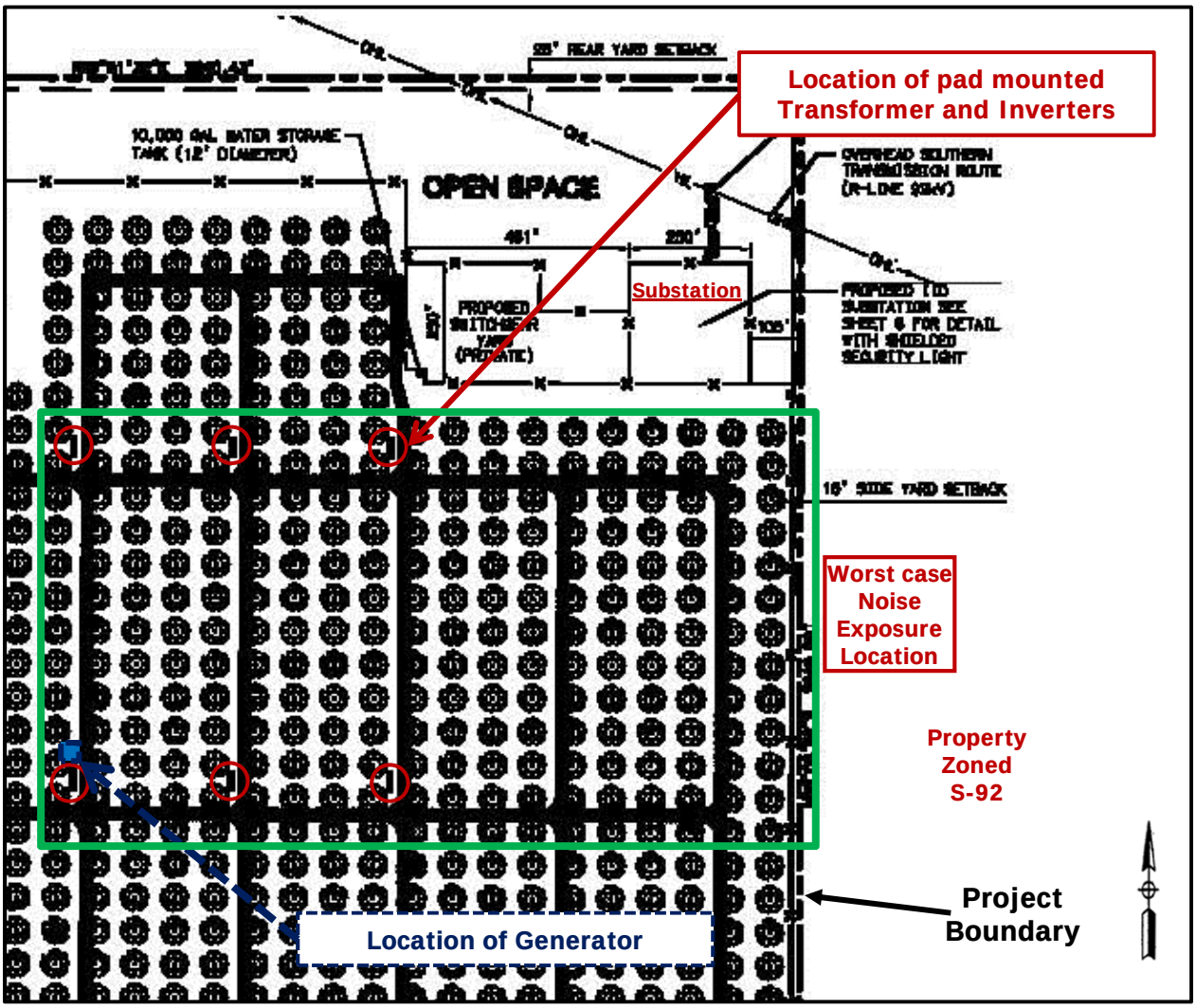
As an example, if the equipment were to operate for only half an hour, then the hourly combined level of 38.0 dBA Leq for continuous operation would be reduced to 35.0 dBA Leq and if the equipment only operational for 15 minutes, then it would be further reduced to 32.0 dBA Leq. Therefore, a combined noise level of 35.0 dBA Leq was utilized. To determine the cumulative noise levels of multiple CPV trackers and blowers, the distances of an array of the 16 closest units at a common point, were measured and the noise levels were propagated to that common point. Based on the spacing of the units, the fifth unit over is 382 feet of more away and the noise level would drop below 10 dBA Leq and would not be audible.

The back-up generators will only be utilized if a complete power failure occurs to rotate the CPV panels into a horizontal position until power it restored. The generator is only anticipated to operate for less than 15 minutes in that situation (similar to a maintenance scheduled operation). Based on several manufacture's specifications the 125 kW generator has a noise level of 68-71 dBA at 23 feet. A generator having a noise level of 71 dBA was utilized and the sound level rating is shown in ***Attachment B*** (Source: Kohler Power, 2012). Since the generator will not operate continuously a 6 decibel reduction was accounted for in the analysis and hourly noise level of 65 dBA Leq was utilized for the generator.

It was determined based on the site configuration and equipment locations that the worst case

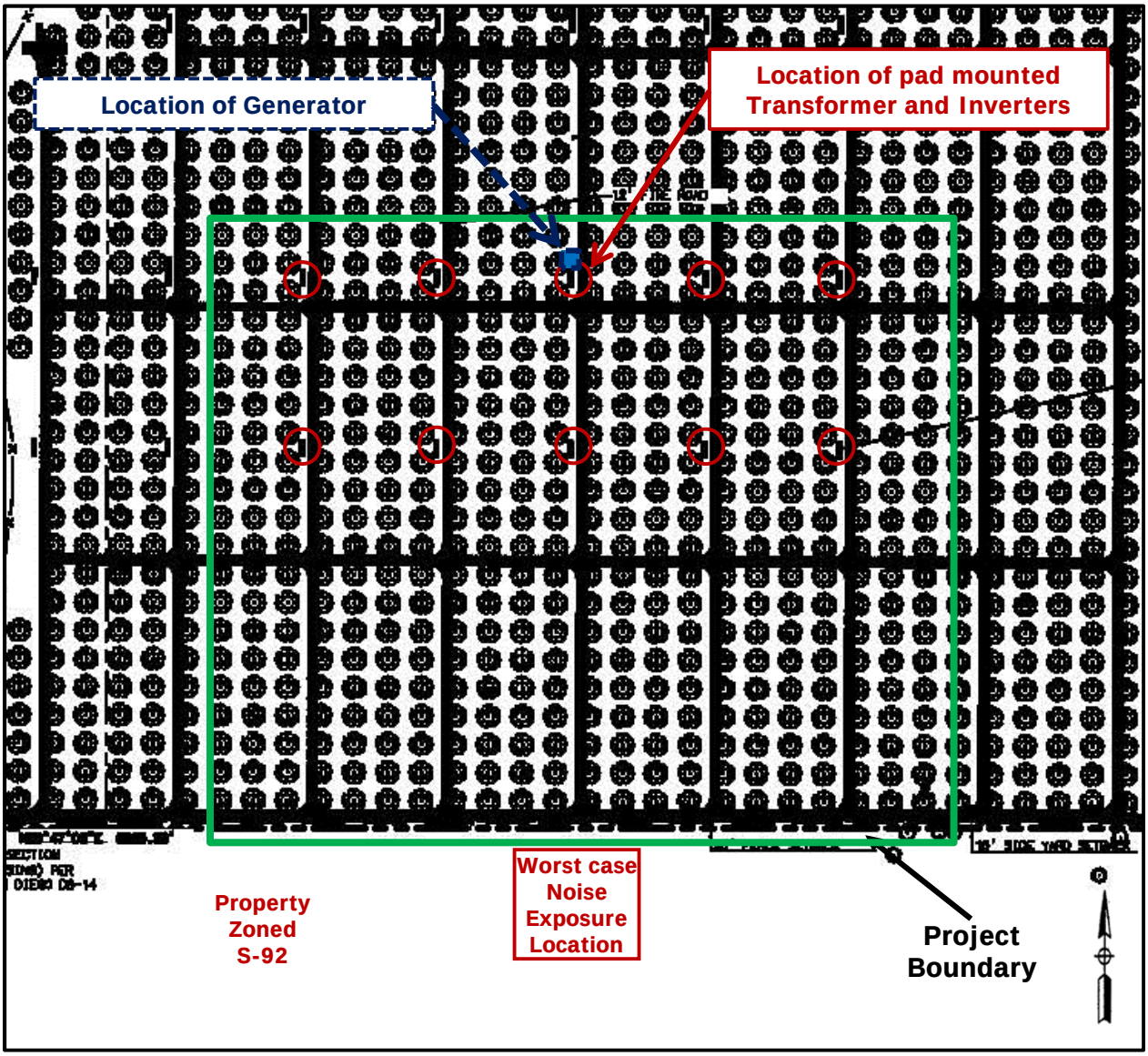
noise exposure would occur at the eastern and southern property lines. The northern and western property lines have less equipment and more distance separation from the equipment. The location and relationship to the worst case eastern and southern property lines for the proposed equipment is shown below in Figures 2-C and 2-D, respectively.

Figure 2-C: CPV Equipment and Property Line Orientation (Eastern PL)



Although, not all the equipment maybe operating at the same time, to be conservative it was assumed that it could happen even though if power were lost and the generator was required all the transformers, inverters and CPV blowers would shut down. The noise levels of the transformers, inverters, generator and multiple CPV tracker motors and blowers were combined and propagated out to the worst case property lines at a common location without any shielding.

Figure 2-D: CPV Equipment and Property Line Orientation (Southern PL)



The equipment located the same distance from the common location was added together. The results of the propagated noise levels are shown in Tables 2-2 and 2-3 for the eastern and southern property lines, respectively. The combined noise level at the nearest property lines were projected to be 45 dBA Leq or less based on the proposed dual-axis rack system (CPV) site configuration and the proposed equipment as described above. Since not all equipment will be simultaneously operating no impacts are anticipated and the Project will comply with the most restrictive nighttime property line standard of 45 dBA Leq and no mitigation is needed.

Table 2-2: CPV Operational Noise Levels – Eastern Property Line

Source	Distance from Source to Measurement Location (Feet)	Sources at that Common Distance	Measured Noise Levels Combined (dBA)	Distance to Nearest Property Line (Feet)	Noise Reduction due to distance (dBA)	Resultant Noise Level @ Property Line (dBA Leq)
Transformer	5	2	63	914	-45	18
Inverter	6	4	83	914	-44	39
Transformer	5	2	63	1219	-48	15
Inverter	6	4	83	1219	-46	37
Transformer	5	1	60	1524	-50	13
Inverter	6	1	77	1524	-48	35
Generator	23	1	65	1524	-36	29
Substation	5	1	71	660	-42	29
Track/Blower	50	2	38	66	-2	36
Track/Blower	50	2	38	91	-5	33
Track/Blower	50	2	38	143	-9	29
Track/Blower	50	2	38	211	-13	26
Track/Blower	50	2	38	146	-9	29
Track/Blower	50	2	38	176	-11	27
Track/Blower	50	2	38	225	-13	25
Track/Blower	50	2	38	282	-15	23
Track/Blower	50	2	38	226	-13	25
Track/Blower	50	2	38	247	-14	24
Track/Blower	50	2	38	283	-15	23
Track/Blower	50	2	38	330	-16	22
Track/Blower	50	2	38	307	-16	22
Track/Blower	50	2	38	322	-16	22
Track/Blower	50	2	38	351	-17	21
Track/Blower	50	2	38	390	-18	20
Cumulative Noise Level @ Property Line (dBA Leq)						45

Table 2-3: CPV Operational Noise Levels – Southern Property Line

Source	Distance from Source to Measurement Location (Feet)	Sources at that Common Distance	Measured Noise Levels Combined (dBA)	Distance to Nearest Property Line (Feet)	Noise Reduction due to distance (dBA)	Resultant Noise Level @ Property Line (dBA Leq)
Transformer	5	2	60	914	-45	15
Inverter	6	4	80	914	-44	36
Transformer	5	2	63	972	-46	17
Inverter	6	4	83	972	-44	39
Transformer	5	1	63	1126	-47	16
Inverter	6	1	83	1126	-45	38
Transformer	5	1	63	1342	-49	14
Inverter	6	1	83	1342	-47	36
Generator	23	2	68	1360	-35	33
Track/Blower	50	2	38	64	-2	36
Track/Blower	50	2	38	121	-8	30
Track/Blower	50	2	38	185	-11	27
Track/Blower	50	2	38	251	-14	24
Track/Blower	50	2	38	146	-9	29
Track/Blower	50	2	38	176	-11	27
Track/Blower	50	2	38	225	-13	25
Track/Blower	50	2	38	282	-15	23
Track/Blower	50	2	38	226	-13	25
Track/Blower	50	2	38	247	-14	24
Track/Blower	50	2	38	283	-15	23
Track/Blower	50	2	38	330	-16	22
Track/Blower	50	2	38	307	-16	22
Track/Blower	50	2	38	322	-16	22
Track/Blower	50	2	38	351	-17	21
Track/Blower	50	2	38	390	-18	20
Cumulative Noise Level @ Property Line (dBA Leq)						45

Dual-Axis Tracking System

As described above, the remaining site configurations (fixed panel, single-axis and dual-axis tracker systems) would have the inverter/transformers location is the same location along with the Substation and back-up generator. Therefore, the worst case noise levels base on these three types of technology would be associated with the single and dual-axis tracker systems because of the tracker motors. The fixed panels would have less noise sources. Therefore, the dual-axis system is analyzed to determine compliance with the County's property line standards.

These potential systems will utilize the same back-up generators as identified above and will only be utilized if a complete power failure occurs to rotate the solar panels into a horizontal position until power it restored. Similarly, the generator is only anticipated to operate for less than 15 minutes in that situation (similar to a maintenance scheduled operation) and hourly noise level of 65 dBA Leq was utilized for the generator. These proposed technologies would utilized a Satcon Commercial Solar Inverter or the SMA Sunny Central Invertor, or equivalent. The SMA Inverter has a higher unshielded noise rating of less than 65 dBA at 5 feet *(Source: National Electric Manufactures Association (NEMA) Publication No. TR 1-1993)*. As stated above, the NEMA specifications are provided as ***Attachment A***. The array tracker motors were found to have a cumulative noise level of 39 dBA at a distance of 100 feet *(Source: Nellis Solar Power Plant Noise Measurements - JBA Consulting Engineers, 2010).* The array tracker noise findings letter is provided as ***Attachment C***.

Based on the site configuration and equipment locations, it was determined that the worst case noise exposure would also occur at the eastern and southern property lines. The northern and western property lines have less equipment and more distance separation from the equipment. The location and relationship to the worst case eastern and southern property lines for the proposed equipment is shown below in Figures 2-E and 2-F, respectively.

Figure 2-E: Equipment and Property Line Orientation (Eastern PL)

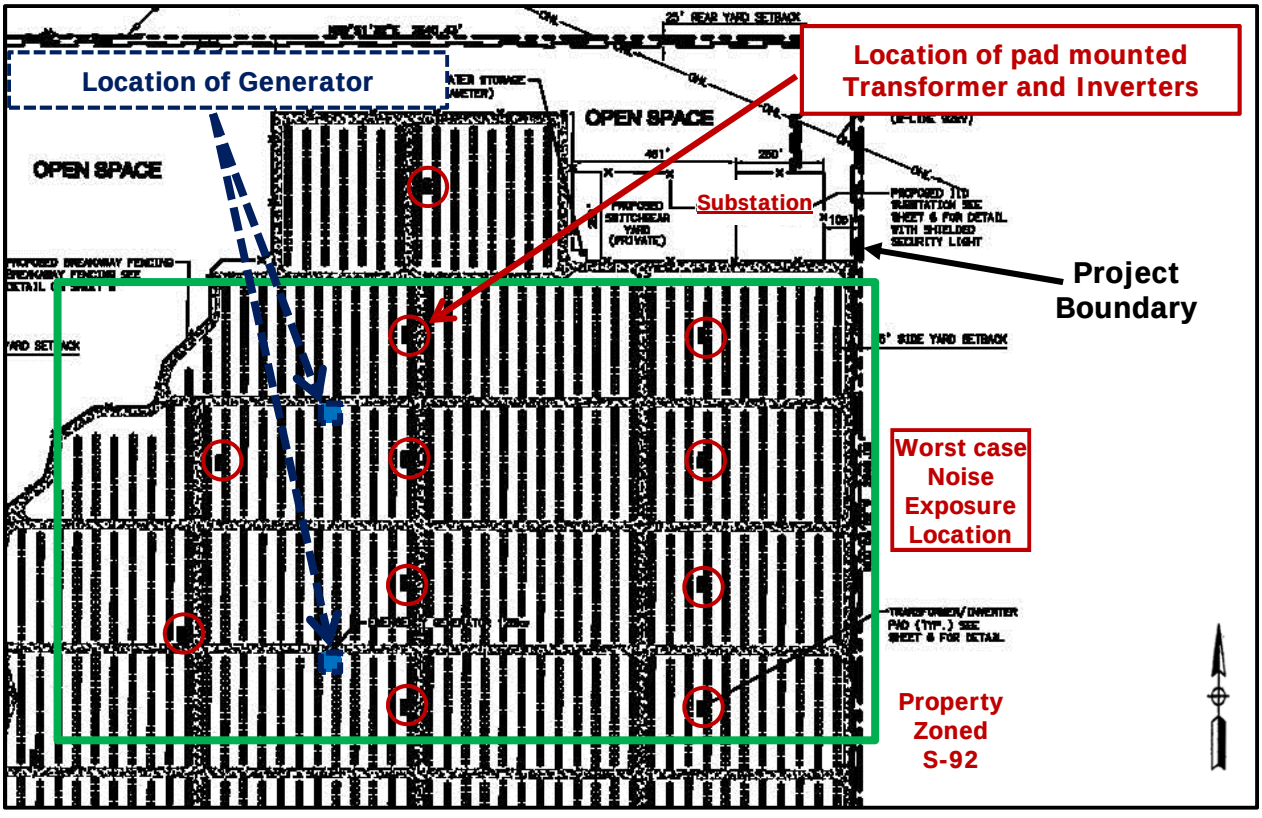
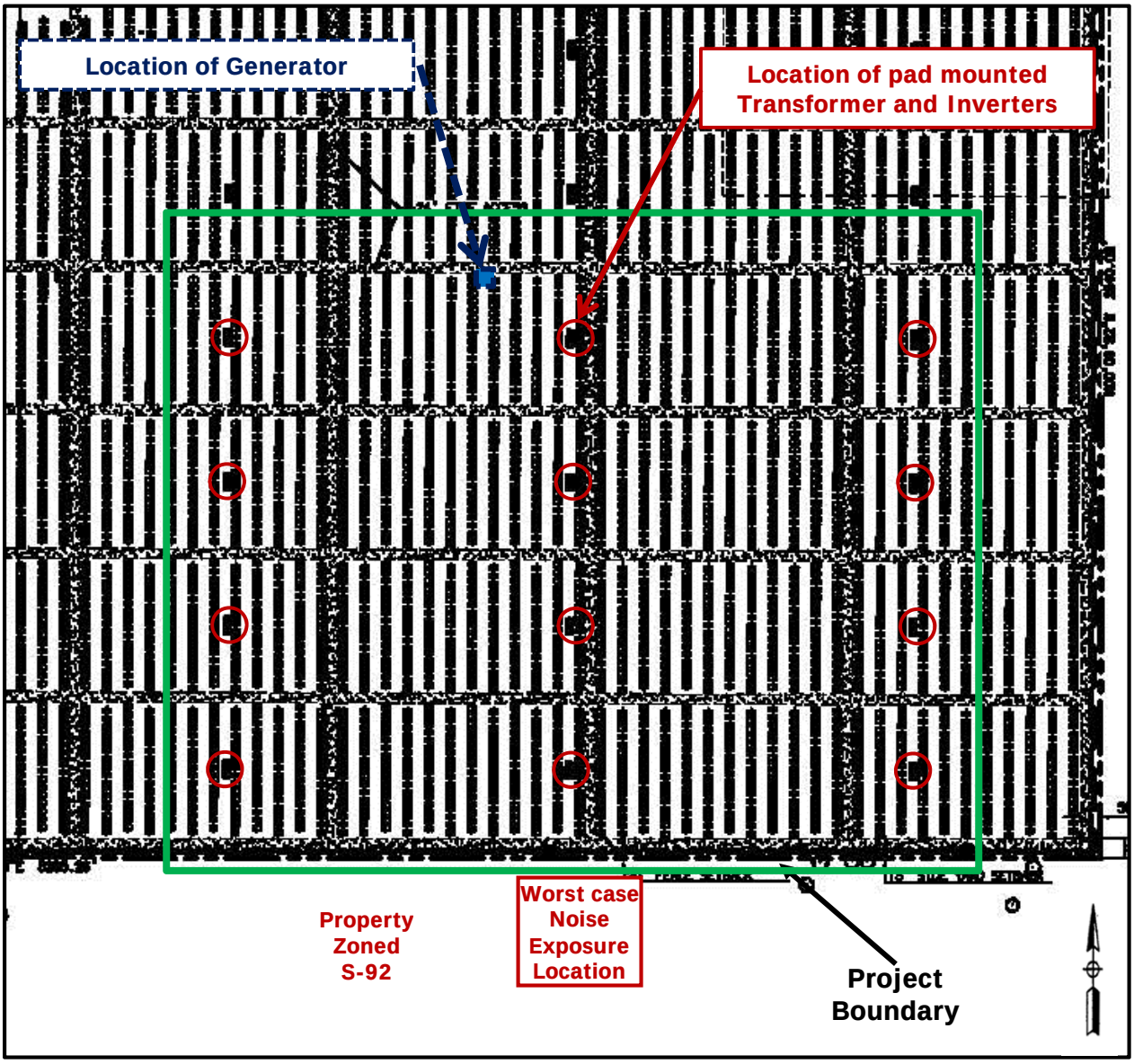


Figure 2-F: Equipment and Property Line Orientation (Eastern PL)



Although, not all the equipment maybe operating at the same time, to be conservative it was assumed that it could happen even though if power were lost and the generator was required all the transformers, inverters and panel motors would shut down. The noise levels of the transformers, inverters, generator and multiple tracker motors were combined and propagated out to the worst case property lines at a common location without any shielding.

The equipment located the same distance from the common location was added together. The results of the propagated noise levels are shown in Tables 2-4 and 2-5 for the eastern and southern property lines, respectively. The combined noise level at the nearest property lines

were projected to be 45 dBA Leq or less based on the proposed dual-axis tracking system site configuration and the proposed equipment as described above. Since not all equipment will be simultaneously operating no impacts are anticipated and the Project will comply with the most restrictive nighttime property line standard of 45 dBA Leq and no mitigation is needed.

Table 2-4: Operational Noise Levels – Eastern Property Line

Source	Distance from Source to Measurement Location (Feet)	Sources at that Common Distance	Measured Noise Levels Combined (dBA)	Distance to Nearest Property Line (Feet)	Noise Reduction due to distance (dBA)	Resultant Noise Level @ Property Line (dBA Leq)
transformer	5	2	61.0	482	-39.7	21
inverter	5	2	71.0	482	-39.7	31
transformer	5	2	61.0	482	-39.7	21
inverter	5	2	71.0	482	-39.7	31
substation	5	1	71.0	223	-33.0	38
Tracker	100	1	39.0	70	3.1	42
Generator	23	2	74.0	1,480	-36.2	32
Cumulative Noise Level @ Property Line (dBA Leq)						44

Table 2-5: Operational Noise Levels – Southern Property Line

Source	Distance from Source to Measurement Location (Feet)	Sources at that Common Distance	Measured Noise Levels Combined (dBA)	Distance to Nearest Property Line (Feet)	Noise Reduction due to distance (dBA)	Resultant Noise Level @ Property Line (dBA Leq)
transformer	5	2	61.0	457	-39.2	22
inverter	5	2	71.0	457	-39.2	32
transformer	5	2	61.0	690	-42.8	18
inverter	5	2	71.0	690	-42.8	28
transformer	5	2	61.0	1,000	-46.0	15
inverter	5	2	71.0	1,000	-46.0	25
Tracker	100	1	39.0	53	5.5	45
Generator	23	2	74.0	1,415	-35.8	32
Cumulative Noise Level @ Property Line (dBA Leq)						45

2.2.2 Corona Affect Noise Levels

The Corona Affect (Corona) is a phenomenon associated with the electrical ionization of the air that occurs near the surface of the energized conductor and suspension hardware due to very high electric field strength. This is audible power line noise that is generated from electric corona discharge, which is usually experienced as a random crackling or hissing sound. The amount of corona produced by a transmission line is a function of the voltage of the line, the diameter of the conductors, the locations of the conductors in relation to each other, the elevation of the line above sea level, the condition of the conductors and hardware, and the local weather conditions.

Corona increases at higher elevations where the density of the atmosphere is less than at sea level. Audible noise will vary with elevation with the relationship of X/300 where X is the elevation of the transmission line above sea level measured in meters (EPRI 2005). Audible noise at 600 meters (~2,000 feet) in elevation will be twice the audible noise at 300 meters, all other things being equal. Typically for transmission lines of 138 kV and less, the maximum corona noise during wet weather conditions is usually less than 40 dBA at the edge of the ROW *(Source: Miguel-Mission 230 kV #2 Project, Aspen Environmental Group, 2004).* Corona typically becomes a design concern for transmission lines at 345 kV and above and is less noticeable from lines like those proposed for the Project that are operated at lower voltages.

The electric field gradient is greatest at the surface of the conductor. Large-diameter conductors have lower electric field gradients at the conductor surface and, hence, lower corona than smaller conductors. Irregularities, such as nicks and scrapes on the conductor surface, concentrate the electric field at these locations and increase the electric field gradient and thus the resulting corona. Similarly, dust or insects on the conductor surface can cause irregularities and are a source for corona along with moister from fog or raindrops. Corona noise is primarily audible during wet weather conditions such as fog and rain. Heavy rain will typically generate a noise level from the falling rain drops hitting the ground that will be greater than the noise generated by corona and thus mask the audible noise from the transmission line.

Corona produced by a transmission line can be reduced by changing the design of the transmission line and through the selection of the conductors and hardware used for the construction of the line. For instance the use of conductor hangers that have rounded rather than sharp edges and no protruding sharp edges will help reduce corona.

To determine the corona of the existing transmissions line, noise measurements were taken along an existing 69 kV transmission lines in the Borrego Springs area. The short-term measurements were conducted by Ldn Consulting December 4, 2009. The noise measurements were conducted along an SDGE easement south of Borrego Springs as depicted previously in

Figure 1-C. Due to ambient noise sources consisting of airplanes, automobiles and birds only one-minute measurements could be taken without the results being affected by factors other than the existing 69 kV transmission lines. During the noise measurements, the crackling or hissing of the transmission lines was slightly audible and the weather conditions were dry and calm. The results of those short-term measurements are provided in Table 2-6 below.

Table 2-6: Measured Corona Noise Levels along 69 kV Lines

Location	Time	One Hour Noise Levels (dBA)					
		Leq	Lmin	Lmax	L10	L50	L90
69 kV Transmission Lines – Borrego Springs	9:35–9:36 a.m.	17.6	16.7	22.7	18.7	17.0	16.8
69 kV Transmission Lines – Borrego Springs	9:37–9:38 a.m.	18.3	17.4	27.2	19.3	18.1	17.7
Source: Ldn Consulting, Inc. December 4, 2009							

As can be seen in Table 2-6, during the dry conditions the noise levels from the Corona were very low, below 20 dBA. Typically during moist or wet conditions the Corona noise can double. This would result in a noise level of 35-37 dBA which is consistent with previous studies and modeling efforts conducted by the Electric Power Research Institute (EPRI) and CH2M Hill for the Cross Valley Transmission Line Project conducted for Southern California Edison 2008.

2.3 Conclusions

Based on the empirical data, the manufactures specifications and the distances to the property lines the unshielded cumulative noise levels from the proposed transformers, inverters, the generator and the CPV track/blower motors or the solar tracking motors were found to meet the most restrictive nighttime property line standard of 45 dBA at the nearest property line zoned S-92. No impacts are anticipated and no mitigation is required.

The measured Corona Affect noise levels were found to be below the County of San Diego's most restrictive nighttime standard of 45 dBA. This was also consistent with previously measured and modeled noise levels on transmission line projects throughout California. No impacts from the Corona Affect are anticipated from the existing transmission lines.

3.0 CONSTRUCTION ACTIVITIES

3.1 Guidelines for the Determination of Significance

Construction Noise: Noise generated by construction activities related to the project will exceed the standards listed in San Diego County Code Sections as follows.

SEC. 36.408: HOURS OF OPERATION OF CONSTRUCTION EQUIPMENT

Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

a. Between 7 p.m. and 7 a.m.

b. On a Sunday or a holiday. For purposes of this section, a holiday means January 1st, the last Monday in May, July 4th, the first Monday in September, December 25th and any day appointed by the President as a special national holiday or the Governor of the State as a special State holiday. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10 a.m. and 5 p.m. at the person's residence or for the purpose of constructing a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limitations in sections 36.409 and 36.410.

SEC. 36.409: SOUND LEVEL LIMITATIONS ON CONSTRUCTION EQUIPMENT

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

SEC. 36.410: SOUND LEVEL LIMITATIONS ON IMPULSIVE NOISE

In addition to the general limitations on sound levels in section 36.404 and the limitations on construction equipment in section 36.409, the following additional sound level limitations shall apply:

(a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410A (provided below), when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410A are as described in the County Zoning Ordinance.

TABLE 36.410A: MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA)

OCCUPIED PROPERTY USE	DECIBELS (dBA)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

(b) Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410B, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410B are as described in the County Zoning Ordinance.

TABLE 36.410B: MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA) FOR PUBLIC ROAD PROJECTS

OCCUPIED PROPERTY USE	dB(A)
Residential, village zoning or civic use	85
Agricultural, commercial or industrial use	90

(c) The minimum measurement period for any measurements conducted under this section shall be one hour. During the measurement period a measurement shall be conducted every minute from a fixed location on an occupied property. The measurements shall measure the maximum sound level during each minute of the measurement period. If the sound level caused by construction equipment or the producer of the impulsive noise exceeds the maximum sound level for any portion of any minute, it will be deemed that the maximum sound level was exceeded during that minute.

3.2 Potential Construction Noise Impacts

Construction noise represents a short-term impact on the ambient noise levels. Noise generated by construction equipment includes haul trucks, water trucks, graders, dozers, loaders and scrapers can reach relatively high levels. Grading activities typically represent one of the highest potential sources for noise impacts. The most effective method of controlling construction noise is through local control of construction hours and by limiting the hours of construction to normal weekday working hours.

The U.S. Environmental Protection Agency (U.S. EPA) has compiled data regarding the noise generating characteristics of specific types of construction equipment. Noise levels generated by heavy construction equipment at a distance of 50 feet can range from 60 dBA for a small tractor up to 100 dBA for rock breakers. However, these noise levels diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. For example, a noise level of 87 dBA measured at 50 feet from the noise source would be reduced to 81 dBA at 100 feet from the source and be further reduced to 75 dBA at 200 feet from the source.

Using a point-source noise prediction model, calculations of the expected construction noise impacts were completed. The essential model input data for these performance equations include the source levels of each type of equipment, relative source to receiver horizontal and vertical separations, the amount of time the equipment is operating in a given day, also referred to as the duty-cycle and any transmission loss from topography or barriers. To determine the worst-case noise levels for the grading operations no topographic attenuation, duty-cycle reductions or barrier reductions were utilized.

According to the project applicant, the project site will be grubbed to remove vegetation and compacted in one phase followed by the installation of the solar panels. The project construction period is expected to be roughly 11 months and includes all site preparation, installation of the solar panels and all utilities. The overall Project grading would vary depending upon the type of solar technology installed, but is estimated to require the same amount of equipment. The grading or site preparation and subsequent installation of the CPV or PV panels are discussed separately below.

The clearing and site preparation operation will utilize a total of up to three dozers, five graders, four loaders/backhoes and four water trucks. The noise levels utilized in this analysis based upon the anticipated list of equipment are shown in Table 3-1. Most of the construction activities will consist of clearing and grubbing the site for the preparation of the CPV or PV panels. The equipment is anticipated to be spread out over the entire site with some equipment potentially operating at or near the property line while the rest of the equipment may be located over 1,000 feet from the same property line. This would result in an acoustical center for the grading operation at approximately 500 feet from the nearest property line.

As can be seen in Table 3-1, if all the equipment was operating in the same location, which is not physically possible, at a distance as close as 165 feet from the nearest property line the point source noise attenuation from construction activities is -10.4 dBA. This would result in an anticipated worst case eight-hour average combined noise level of 74.9 dBA at the property line. Given this and the spatial separation of the equipment, the noise levels will comply with the County of San Diego's 75 dBA standard at all Project property lines.

Table 3-1: Construction Grading/Site Preparation Noise Levels

Construction Equipment	Quantity	Duty Cycle (Hours/Day)	Source Level @ 50-Feet (dBA)	Cumulative Noise Level @ 50-Feet (dBA Leq-8h)
Grader	5	8	74	81.0
Water Truck	4	8	70	76.0
Dozer	3	8	75	79.8
Loader	4	8	73	79.0
			Cumulative Levels @ 50 Feet (dBA)	85.3
			Distance To Property Line	165
			Noise Reduction Due To Distance	-10.4
			NEAREST PROPERTY LINE NOISE LEVEL	74.9

The installation of the solar panels may utilize a total of two small pile drivers to install the panel stands, two mobile cranes to move the panels in position and two pneumatic tools to secure the panels to the stands. The noise levels utilized in this analysis based upon the anticipated list of equipment are shown in Table 3-2. Based upon normal installation procedures the equipment is anticipated to be spread out over the entire site with pile driving occurring first and then the installation of the panels with a crane and pneumatic tool. Some equipment may be operating at a distance of 70-120 feet from the property line while the rest of the equipment may be located over 500 feet from the other equipment and same property line. This would result in an acoustical center from the installation operations of at least 300 feet to the nearest property line around the perimeter of the site. The distance to the property lines would increase as the interior panels are installed and the noise levels would decrease due to distance.

Table 3-2: PV Panel Installation Noise Levels

Construction Equipment	Quantity	Duty Cycle (Hours/Day)	Source Level @ 50-Feet (dBA)	Cumulative Noise Level @ 50-Feet (dBA Leq-8h)
Pneumatic Tool	2	8	82	85.0
Mobile Crane	2	8	78	81.0
Pile Driver	2	8	84	87.0
			Cumulative Levels @ 50 Feet (dBA)	89.8
			Distance To Property Line	275
			Noise Reduction Due To Distance	-14.8
			NEAREST PROPERTY LINE NOISE LEVEL	74.9

As can be seen in Table 3-2, if all the equipment was operating in the same location, which is not physically possible, at a distance as close as 275 feet from the nearest property line the point source noise attenuation from construction activities is -14.8 dBA. This would result in an anticipated worst case eight-hour average combined noise level of 74.9 dBA at the property line. Given this and the spatial separation of the equipment, the noise levels will comply with the County of San Diego's 75 dBA standard at all Project property lines.

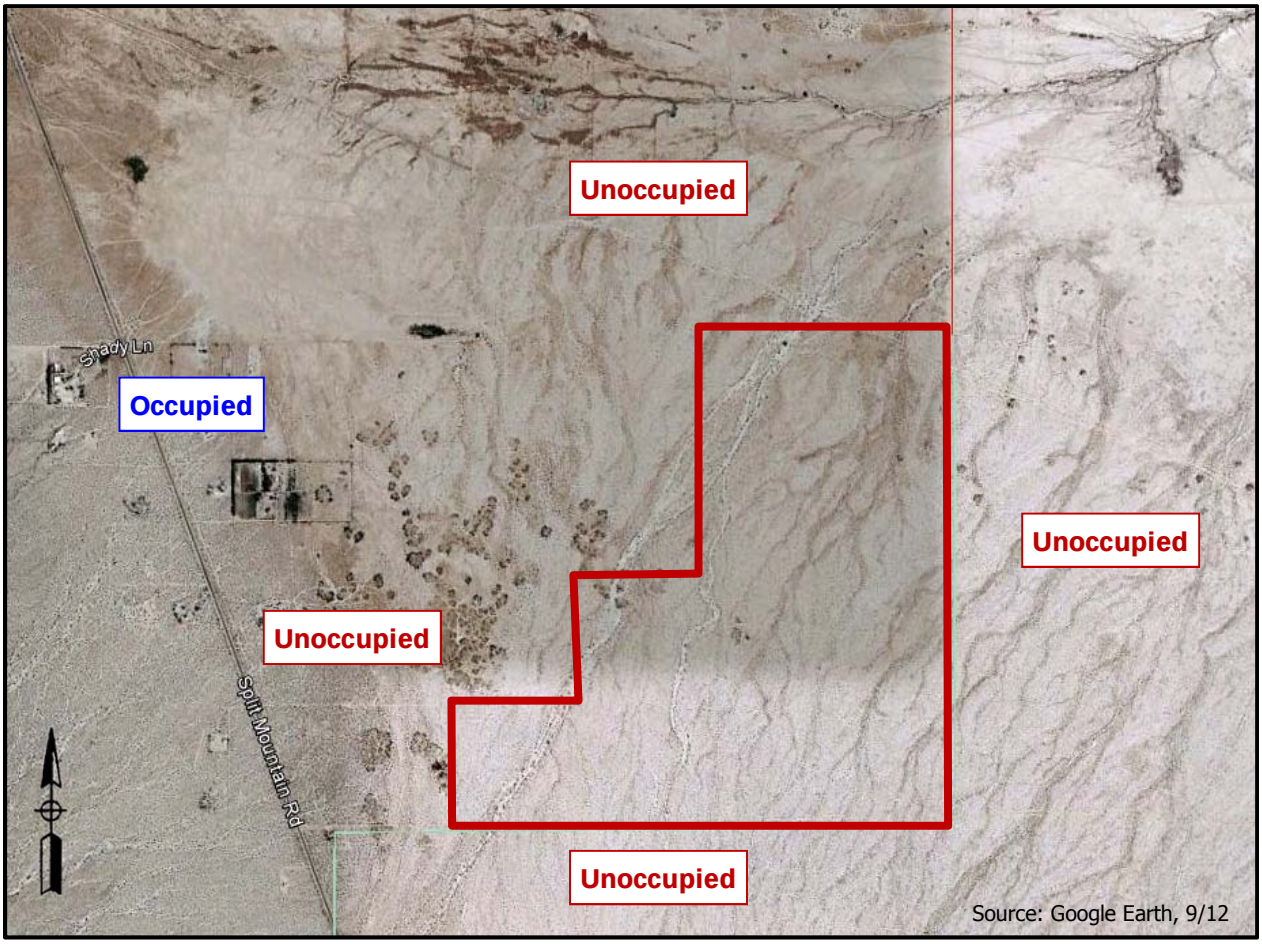
Additionally, the County Noise Ordinance Section 36.410, states that except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown of 82 dBA (at residential uses), when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period. The maximum sound level and uses are shown above in Table 36.410A as described in the County Zoning Ordinance.

The installation of the solar panels may utilize a total of two small pile drivers to install the panel stands that could produce impulsive noise. Based upon normal installation procedures the two pile drivers are anticipated to be separated on the site. A single pile driver would be operating at a distance of 50 feet from the property line for a short time to install a single panel stand. The pile driver would then move further from the property line to set another panel stand and continue is this fashion. Each panel stand installation process is only anticipated to last 5 minutes or less.

Pile drivers can produce maximum noise levels (Lmax) of 95 dBA at a distance of 50 feet when the drive head is operating (Source: Central Artery/Tunnel (CA/T) project in Boston, Massachusetts). Typically, a pile drive is not continuously operating at full power; this is referred to as the usage factor. The usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power. Based on empirical data collected CA/T project which was used to develop the Road Construction Noise Model (RCNM), a pile driver has a usage factor of 20%. Since the maximum noise level from a pile driver exceeds the County's maximum noise level threshold of 82 dBA the following recommendations are presented. To reduce the maximum noise level of 95 dBA to 82 dBA the pile driver would need to be located 215 feet from the nearest occupied residential property line or only operate 25% of the hourly or daily duration (15 minutes of any hour and 2 hours of a 8 hour work day) when located within that distance. Based on these duration and distance parameters the impulsive noise levels are anticipated to be below the County's most restrictive 82 dBA threshold and no impacts are anticipated and no mitigation measures are required.

The County Noise Ordinance pertains to a property having an occupied structure. Currently, none of the adjacent properties have existing occupied structures as can be seen in Figure 3-A below and therefore are exempt from the Noise Ordinance Sections 36.408-36.410. If properties become occupied prior to or during the construction of the Project then a 215 foot setback for the pile drivers or a 25% time restriction would apply.

Figure 3-A: Potential Properties Affected near the Project Site



3.2 Construction Conclusions

At a distance as close as 165 feet the point source noise attenuation from the grading activities and the nearest property line is -10.4 dBA. This would result in an anticipated worst case eight-hour average combined noise level of 74.9 dBA at the property line. During the installation of the solar panels at a distance of 275 feet would result in a noise level of 74.9 dBA. The installation equipment is anticipated to average more than 300 feet from the nearest property line. Given this and the spatial separation of the equipment over the large site area, the noise levels of the grading

and panel installation are anticipated to comply with the County of San Diego's 75 dBA standard at all Project property lines.

Additionally, the County Noise Ordinance Section 36.410, states that no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown of 82 dBA (at residential uses), when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period. To reduce the maximum noise level of 95 dBA to 82 dBA the pile driver would need to be located 215 feet from the nearest occupied residential property line or only operate 25% of the hourly or daily duration (15 minutes of any hour and 2 hours of a 8 hour work day) when located within that distance. Based on these duration and distance parameters the impulsive noise levels are anticipated to be below the County's most restrictive 82 dBA threshold and no impacts are anticipated and no mitigation measures are required.

The County Noise Ordinance pertains to a property having an occupied structure. Currently, none of the adjacent properties have existing occupied structures and therefore are exempt from the Noise Ordinance Sections 36.408-36.410. If properties become occupied prior to or during the construction of the Project then a 215 foot setback for the pile drivers or a 25% time restriction would apply.

4.0 SUMMARY OF PROJECT IMPACTS, MITIGATION & CONCLUSIONS

- Operational Noise Analysis

  Based on the empirical data, the manufactures specifications and the distances to the property lines the unshielded cumulative noise levels from the proposed transformers/inverters and the proposed Substation were found to be below the most restrictive nighttime property line standard of 45 dBA. No impacts are anticipated and no mitigation is required.

  The measured Corona Affect noise levels were found to be below the County of San Diego's most restrictive nighttime standard of 45 dBA. This was also consistent with previously measured and modeled noise levels on transmission line projects throughout California. No impacts from the Corona Affect are anticipated from the existing transmission line near the proposed Project.

- Construction Noise Analysis

  At a distance as close as 165 feet the point source noise attenuation from the grading activities and the nearest property line is -10.4 dBA. This would result in an anticipated worst case eight-hour average combined noise level of 74.9 dBA at the property line. During the installation of the solar panels at a distance of 275 feet would result in a noise level of 74.9 dBA. The installation equipment is anticipated to average more than 300 feet from the nearest property line. Given this and the spatial separation of the equipment over the large site area, the noise levels of the grading and panel installation are anticipated to comply with the County of San Diego's 75 dBA standard at all Project property lines.

  Additionally, the County Noise Ordinance Section 36.410, states that no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown of 82 dBA (at residential uses), when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period. To reduce the maximum noise level of 95 dBA to 82 dBA the pile driver would need to be located 215 feet from the nearest occupied residential property line or only operate 25% of the hourly or daily duration (15 minutes of any hour and 2 hours of a 8 hour work day) when located within that distance. Based on these duration and distance parameters the impulsive noise levels are anticipated to be below the County's most restrictive 82 dBA threshold and no impacts are anticipated and no mitigation measures are required. Currently none of the adjacent properties have existing occupied structures and therefore are exempt from the Noise Ordinance Sections 36.408-36.410. If properties become occupied prior to or during the construction of the Project then a 215 foot setback for the pile drivers or a 25% time restriction would apply.

5.0 CERTIFICATIONS

The contents of this report represent an accurate depiction of the existing and future acoustical environment and impacts within the proposed Ocotillo Wells Solar Project development. The report was prepared by Jeremy Louden; a County approved CEQA Consultant for Acoustics.

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Ldn Consulting, Inc.
jlouden@ldnconsulting.net
760-473-1253

Date March 6, 2013

ATTACHMENT A

NEMA SPECIFICATIONS AND NOISE DATA
(Transformers and Inverters)

NEMA Standards Publication No. TR 1-1993 (R2000)

Transformers, Regulators and Reactors

Published by:

National Electrical Manufacturers Association
1300 North 17th Street, Suite 1847
Rosslyn, VA 22209

TABLE OF CONTENTS

FOREWORD

The standards appearing in this publication have been developed by the Transformer Section and have been approved for publication by the National Electrical Manufacturers Association. They are used by the electrical industry to promote production economies and to assist users in the proper selection of transformers.

The Transformer Section is working actively with the American National Standards Committee, C57, on Transformers, Regulators and Reactors, in the development, correlation and maintenance of national standards for transformers. This Committee operates under the procedures of the American National Standards Institute (ANSI).

It is the policy of the NEMA Transformer Section to remove material from the NEMA Standards Publication as it is adopted and published in the American National Standard C57 series. The NEMA Standards Publication for Transformers, Regulators and Reactors references these and other American National Standards applying to transformers, and is intended to supplement, without duplication, the American National Standards.

The NEMA Standards Publication for Transformers, Regulators and Reactors contains provision for the following:

a. American National Standards adopted by reference and applicable exceptions approved by NEMA, if any.
b. NEMA Official Standards Proposals. These are official drafts of proposed standards developed within NEMA or in cooperation with other interested organizations, for consideration by ANSI. They have a maximum life of five years, during which time they may be approved as American National Standards or adopted as NEMA Standards, or rescinded.
c. Manufacturing Standards. These are NEMA Standards which are primarily of interest to the manufacturers of transformers and which are not yet included in an American National Standard.
d. Standards Which Are Controversial. These are NEMA Standards, on which there is a difference of opinion within Committee C57. The NEMA version will be included in the NEMA Standards Publication until such time as the differences between ANSI and NEMA are resolved.

NEMA Standards Publications are subject to periodic review and take into consideration user input. They are being revised constantly to meet changing economic conditions and technical progress. Users should secure latest editions. Proposed or recommended revisions should be submitted to:

Vice President, Engineering Department
National Electrical Manufacturers Association
2101 L Street, N.W.
Washington, D.C. 20037-1526

SCOPE

This publication provides a list of all ANSI C57 Standards that have been approved by NEMA. In addition it includes certain NEMA Standard test methods, test codes, properties, etc., of liquid-immersed transformers, regulators, and reactors that are not American National Standards.

PART 0
GENERAL

The following American National Standards have been approved as NEMA Standards and should be inserted in this Part 0:

ANSI/IEEE C57.12.00-1988	*General Requirements for Liquid-Immersed Distribution, Power and Regulating Transformers*
ANSI/IEEE C57.12.01-1989	*General Requirements for Dry Type Power and Distribution Transformers*
ANSI C57.12.10-1988	*Requirements for Transformers 230,000 volts and below, 833/958-8333/10,417 kVA single-phase 750/862-60,000/80,000/100,000 kVA three phase, including supplements*
ANSI C57.12.70-1993	*Terminal Markings and Connections for Distribution and Power Transformers*
ANSI/IEEE C57.12.90-1993	*Test Code for Liquid-immersed Distribution, Power & Regulating Transformers and Guide for Short-Circuit Testing of Distribution & Power Transformers*
ANSI/IEEE C57.19.00-1992	*General Requirements and Test Procedure for Outdoor Apparatus Bushings*
ANSI/IEEE C57.19.01-1992	*Standard Performance Characteristics & Dimensions for Outdoor Apparatus Bushings*
ANSI/IEEE C57.92-1992	*Guide for Loading Mineral-oil-immersed Power Transformers up to and including 100 MVA with 55C or 65C Average Winding Rise*

The NEMA Standards TR 1-0.01 through TR 1-0.09 on the following pages (see Part 0 Pages 1–9) also apply generally to transformers.

0.01 PREFERRED VOLTAGE RATINGS

Preferred system voltages and corresponding transformer voltage ratings are given in the American National Standard for Electric Power Systems and Equipment--Voltage Ratings (60 Hz), C84.1-1989. It is recommended that these ratings be used as a guide in the purchase and operation of transformers.

0.02 FORCED-AIR (FA) AND FORCED-OIL (FOA) RATINGS

Under the conditions of par. 5.11 of American National Standard ANSI/IEEE C57.12.00-1988, the relationship between self-cooled ratings and forced-air-cooled or forced-oil-cooled ratings shall be in accordance with Table 0-1.

Table 0-1
FORCED-AIR AND FORCED-OIL RATINGS RELATIONSHIPS

	Self-cooled Ratings* (kVA)		Percent of Self-Cooled Ratings With Auxiliary Cooling	
Class	Single Phase	Three Phase	First Stage	Second Stage
OA/FA	501-2499	501-2499	115	--
OA/FA	2500-9999	2500-11999	125	--
OA/FA	10000 and above	12000 and above	133-1/3	--
OA/FA/FA	10000 and above	12000 and above	133-1/3	166-2/3
OA/FA/FOA	10000 and above	12000 and above	133-1/3	166-2/3
OA/FOA/FOA	10000 and above	12000 and above	133-1/3	166-2/3

*In the case of multi-winding transformers or autotransformers, the ratings given are the equivalent two-winding ratings.

PERFORMANCE

0.03 RADIO INFLUENCE VOLTAGE LEVELS

The following values apply to liquid-filled transformers. They do not apply to load tap changing during switching or to operation of auxiliary relays and control switches.

0.03.1 Distribution Transformers

Radio influence voltage levels for distribution transformers, for systems rated 69 kV and less, shall not exceed 100 microvolts when measured in accordance with Section 7.01. The test voltage shall be the line-to-neutral voltage corresponding to 110 percent excitation of the transformer. This will be the coil voltage for wye connections and 1/3 times the coil voltage for delta connections.

0.04 POWER FACTOR OF INSULATION OF OIL-IMMERSED TRANSFORMERS

While the real significance which can be attached to the power factor of oil-immersed transformers is still a matter of opinion, experience has shown that power factor is helpful in assessing the probable conditions of the insulation when good judgement is used.

The proper interpretation of power factor of oil-immersed transformers is being given careful attention by manufacturers in connection with the problems of (1) selecting insulating materials, (2) sealing, and (3) processing the transformers. However, it is the comparative values which are guides for the successful solution for these problems rather than an absolute value of power factor.

The generally accepted factory tests for proving the insulation level are the prescribed low-frequency tests and impulse tests given in the American National Standard C57.12.90-1993.

When required, a factory power-factor test can be made, and this measurement will be of value for comparison with field power-factor measurements to assess the probable condition of the insulation. It is not feasible to establish standard power-factor values for oil-immersed transformers because:

a. Experience has definitely proved that little or no relation exists between power factor and the ability of the transformer to withstand the prescribed dielectric tests.
b. Experience has definitely proved that the variation in power factor with temperature is substantial and erratic so that no single correction curve will fit all cases.

When a factory power-factor measurement of a transformer is required, the measurement should be made with the insulation at room temperature, preferably at or close to 20°C.

0.05 AUDIBLE SOUND LEVELS

Transformers shall be so designed that the average sound level will not exceed the values given in Tables 0-2 through 0-4 when measured at the factory in accordance with the conditions outlined in ANSI/IEEE C57.12.90-1993.

The guaranteed sound levels should continue to be per Tables 0-2 through 0-4 until such time as enough data on measured noise power levels becomes available.

Sound pressure levels are established and published in this document. Sound power may be calculated from sound pressure, using the method described in C57.12.90-1993.

Rectifier, railway, furnace, grounding, mobile and mobile unit substation transformers are not covered by the tables. The tables do not apply during the time that power switches are operating in load-tap-changing transformers and in transformers with integral power switches.

ble 0-2

AUDIBLE SOUND LEVELS F .-IMMERSED POWER TRANSFORMERS

Column 1 - Class*OA, Ow and FOW Ratings
Column 2 - Class* FA and FOA First stage Auxiliary Cooling**†
Column 3 - Straight FOA* Ratings, FA* FOA* Second-stage Auxiliary Cooling*†

Average Sound Level††, Decibels	Equivalent Two-winding Rating▲																	
	350 kV BIL and Below			450, 550, 650 kV BIL			750 and 825 kV BIL			900 and 1050 kV BIL			1175 kV BIL			1300 kV BIL and Above		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
57	700	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...
58	1000	.	. .	...	..	..	...	...	...	...	...	...	...	...	...	...	...	...
59	--	. .	...	700	...	...	...	...	...	...	...	...	...	...	...	...	...	...
60	1500	. .	..	1000	...	...	. .	..	...	...	...	...	...	...	...	...	...	...
61	2000	.	. .	...	...	.	...	...	..	...	...	...	...	...	...	...	...	...
62	2500	...	...	1500	...	.	.	..	..	..	...	...	...	..	..	...	...	...
63	3000	...	...	2000	...	..	. .	...	...	...	...	. .	...	..	...	...	...	...
64	4000	...	...	2500	...	...	...	...	...	...	...	...	...	...	...	...	...	...
65	5000	...	...	3000	...	...	...	...	...	...	...	...	...	..	...	...	...	...
66	6000	...	...	4000	.	.	3000	...	...	...	...	...	...	...	...	...	...	...
67	7500	6250▲▲	..	5000	3750▲▲	..	4000	3125▲▲	..	..	...	. .	...	..	...	...	...	...
68	10000	7500		6000	5000	.	5000	3750	...	. .	...	. .	...	..	...	...	...	...
69	12500	9375	.	7500	6250	..	6000	5000	...	...	...	...	...	...	...	...	...	...
70	15000	12500	.	10000	7500	..	7500	6250	. .	...	...	...	..	. .	...	...	...	...
71	20000	16667		12500	9375		10000	7500	...	...	...	...	...	...	...	...	...	...
72	25000	20000	20800	15000	12500	..	12500	9375	...	...	...	...	...	..	...	...	...	...
73	30000	26667	25000	20000	16667	...	15000	12500	...	12500	...	. .	...	...	..	...	...	...
74	40000	33333	33333	25000	20000	20800	20000	16667	...	15000	...	...	12500	...	...	...	...	...
75	50000	40000	41667	30000	26667	25000	25000	20000	20800	20000	16667	...	15000	...	...	12500	...	...
76	60000	53333	50000	40000	33333	33333	30000	26667	25000	25000	20000	20800	20000	16667	. .	15000	...	...
77	80000	66687	66667	50000	40000	41667	40000	33333	33333	30000	26667	25000	25000	20000	20800	20000	16667	...
78	100000	80000	83333	60000	53333	50000	50000	40000	41667	40000	33333	33333	30000	26667	25000	25000	20000	20800
79	...	106667	100000	80000	66667	66667	60000	53333	50000	50000	40000	41667	40000	33333	33333	30000	26667	25000
80	..	133333	133333	100000	80000	83333	80000	66667	66667	60000	53333	50000	50000	40000	41667	40000	33333	33333
81	...	...	166667	...	106667	100000	100000	80000	83333	80000	66667	66667	60000	53333	50000	50000	40000	41667
82	...	...	200000	...	133333	133333	...	106667	100000	100000	80000	83333	80000	66667	66667	60000	53333	50000
83	..	...	250000	...	...	166667	...	133333	133333	...	106667	100000	100000	80000	83333	80000	66667	66667
84	..	...	300000	...	...	200000	...	...	166667	...	133333	133333	...	106667	100000	100000	80000	83333
85	..	...	400000	...	...	250000	...	...	200000	...	...	166667	...	133333	133333	...	106667	100000
86	...	...	...	...	...	300000	...	...	250000	...	...	200000	...	...	166667	...	133333	133333
87	...	...	...	...	...	400000	...	...	300000	...	...	250000	...	...	200000	...	...	166667
88	...	...	...	...	...	...	...	...	400000	...	...	300000	...	...	250000	...	...	200000
89	...	...	...	...	...	...	...	...	...	...	...	400000	...	...	300000	...	...	250000
90	...	...	...	...	...	..	...	...	...	...	...	...	...	...	400000	...	...	300000
91	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	400000

*Classes of cooling (see 2.6.1 of American National Standard C57.12.00-1988.
**First- and second-stage auxiliary cooling (see TR 1.0.02).
†For column 2 and 3 ratings, the sound levels are with the auxiliary cooling equipment in operation.
††For intermediate kVA ratings, use the average sound level of the next larger kVA rating.
▲The equivalent two-winding 55°C or 65°C rating is defined as one-half the sum of the kVA rating of all windings.
▲▲Sixty-seven decibels for all kVA ratings equal to this or smaller.

Table 0-3
AUDIBLE SOUND LEVELS FOR LIQUID-IMMERSED DISTRIBUTION TRANSFORMERS AND NETWORK TRANSFORMERS

Equivalent Two-winding kVA	Average Sound Level, Decibels
0–50	48
51–100	51
101–300	55
301–500	56
750	57
1000	58
1500	60
2000	61
2500	62

Table 0-4
AUDIBLE SOUND LEVELS FOR DRY-TYPE TRANSFORMERS 15000-VOLT NOMINAL SYSTEM VOLTAGE AND BELOW

Equivalent Two-Winding kVA	Average Sound Level, Decibels		Equivalent Two-winding kVA	Average Sound Level, Decibels Ventilated Forced Air Cooled **,†
	Self-cooled Ventilated*	Self-cooled Sealed*		
0–50	50	50	...	...
51–150	55	55	...	...
151–300	58	57	3–300	67
301–500	60	59	301–500	67
501–700	62	61	501–833	67
701–1000	64	63	834–1167	67
1001–1500	65	64	1168–1667	68
1501–2000	66	65	1668–2000	69
2001–3000	68	66	2001–3333	71
3001–4000	70	68	3334–5000	73
4001–5000	71	69	5001–6667	74
5001–6000	72	70	6668–8333	75
6001–7500	73	71	8334–10000	76

* Class AA rating

**Does not apply to sealed-type transformers

†Class FA and AFA ratings

ATTACHMENT B

KOHLER SPECIFICATIONS AND NOISE DATA
(Generators)

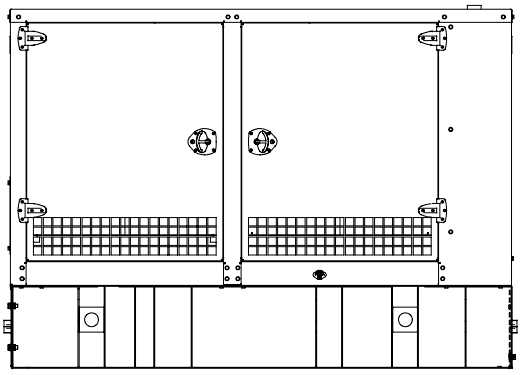
KOHLER POWER SYSTEMS

Weather/Sound Enclosure and Subbase Fuel Tank Package

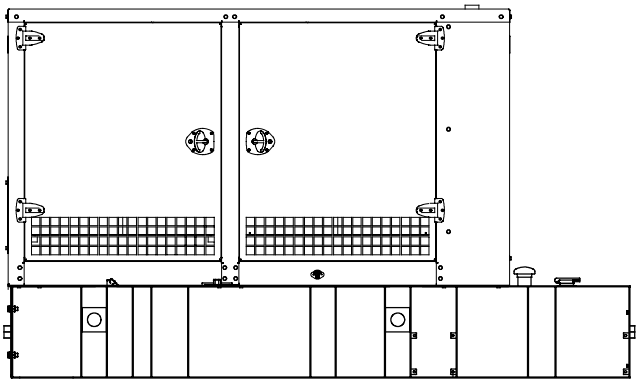
ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

Applicable to the following:

20–60REOZJC
50/60REOZJD
80–275REOZJE
80–200REOZJF
125REOZJG
300REOZJ



Enclosure with Standard Subbase Fuel Tank



Enclosure with State Code Subbase Fuel Tank

Weather Enclosure Standard Features

- Internal-mounted critical silencer and flexible exhaust connector.
- Lift base or tank-mounted, steel construction with hinged doors.
- Fade-, scratch-, and corrosion-resistant Kohler® cream beige powder-baked finish.
- Lockable, flush-mounted door latches.
- Vertical air inlet and outlet discharge to redirect air and reduce noise.
- Certified to withstand 241 kph (150 mph) wind load rating. Available on all models, except 80–150REOZJE with steel enclosure and 125REOZJF with steel enclosure.

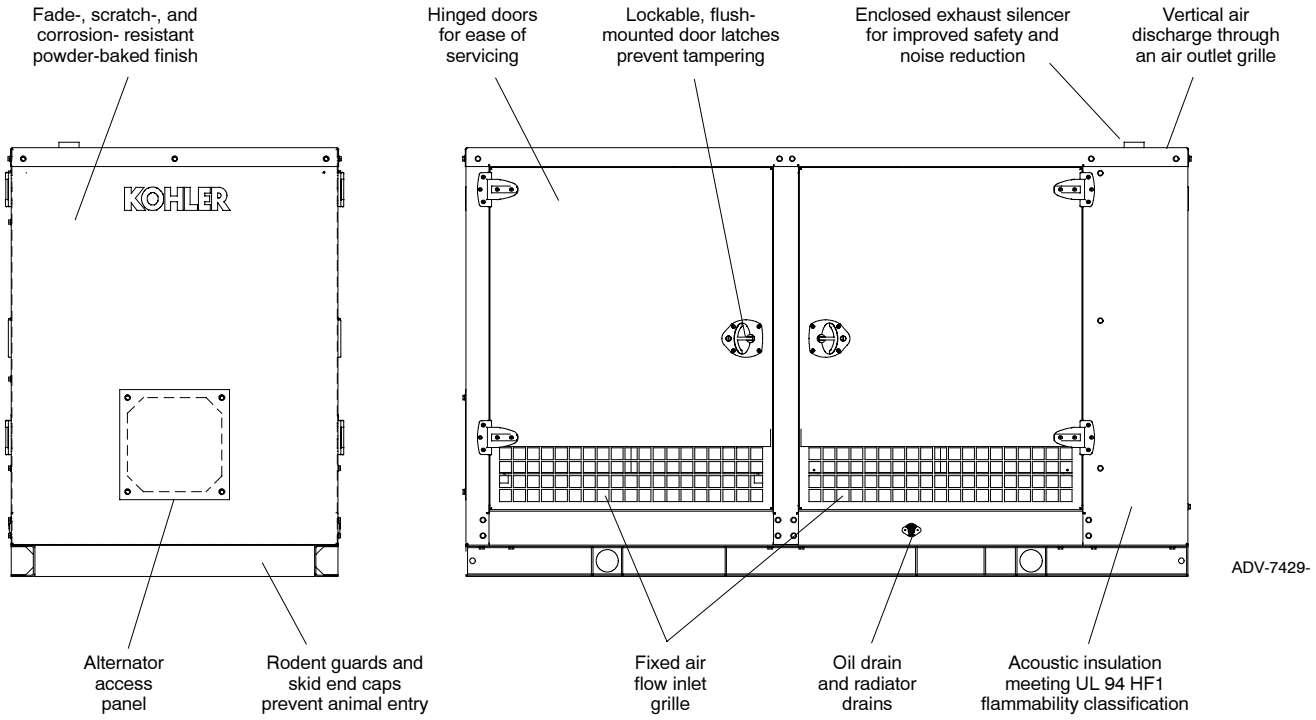
Sound Enclosure Standard Features

- Includes all of the weather enclosure features with the addition of acoustic insulation material.
- Lift base or tank-mounted, steel or aluminum construction with hinged doors. Aluminum enclosures are recommended for high humidity and/or high salt/ coastal regions.
- Acoustic insulation that meets UL 94 HF1 flammability classification and repels moisture absorption.
- Sound attenuated enclosure that uses up to 51 mm (2 in.) of acoustic insulation.

Subbase Fuel Tank Features

- The above-ground rectangular secondary containment tank mounts directly to the generator set, below the generator set skid (subbase).
- Both the inner and outer tanks have emergency relief vents.
- Flexible fuel lines are provided with subbase fuel tank selection.
- The secondary containment generator set base tank meets UL 142 tank requirements. The inner (primary) tank is sealed inside the outer (secondary) tank. The outer tank contains the fuel if the inner tank leaks or ruptures.

Weather and Sound Enclosure



Note: 20–60REOZJC models shown, other models are similar. Refer to the respective ADV drawings for details.

Enclosure Features

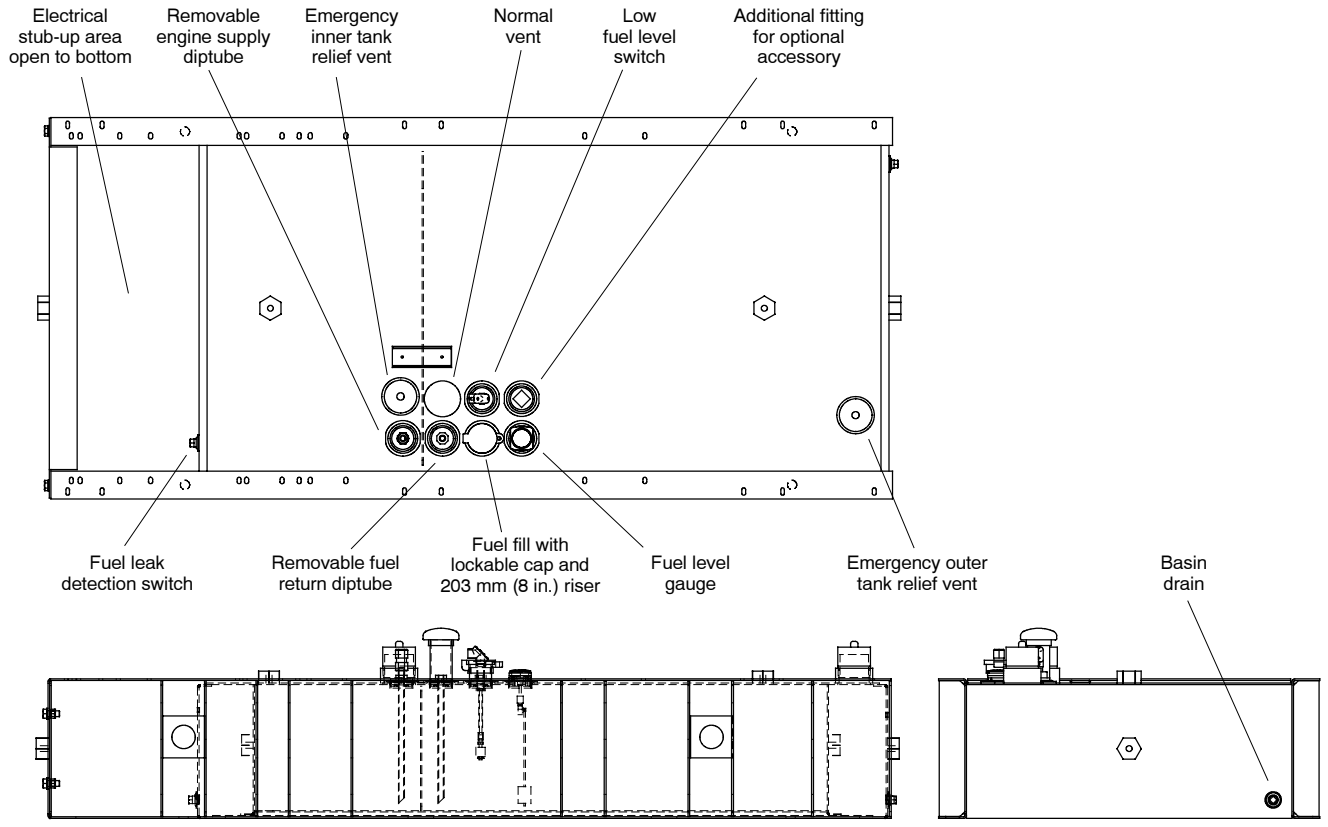
- Available in steel (14 gauge) formed panel, solid construction. Preassembled package offering corrosion resistant, dent resilient structure mounting directly to lift base or fuel tank.
- Powder-baked paint. Superior finish, durability, and appearance.
- Internal critical exhaust silencer offering maximum component life and operator safety.

  NOTE: To avoid exceeding the engine manufacturer's maximum allowable backpressure specification, enclosure tail pipe extensions or attachments are not recommended.
- Interchangeable modular panel construction. Allows complete serviceability or replacement without compromising enclosure design.
- Cooling/combustion air intake with a horizontal air inlet. Sized for maximum cooling airflow.
- Service access. Multi-personnel doors for easy access to generator set control and servicing of the fuel fill, fuel gauge, oil fill, and battery.
- Cooling air discharge. Weather protective design featuring a vertical air discharge outlet grille. Redirects cooling air up and above enclosure to reduce ambient noise.

Additional Sound Enclosure Features

- Available in steel (14 gauge) or aluminum 3.2 mm (0.125 in.) formed panel, solid construction.
- Attenuated design. Acoustic insulation UL 94 HF1 listed for flame resistance offering up to 51 mm (2 in.) mechanically restrained acoustic insulation.
- Cooling air discharge. The sound enclosures include acoustic insulation with urethane film.

Subbase Fuel Tank

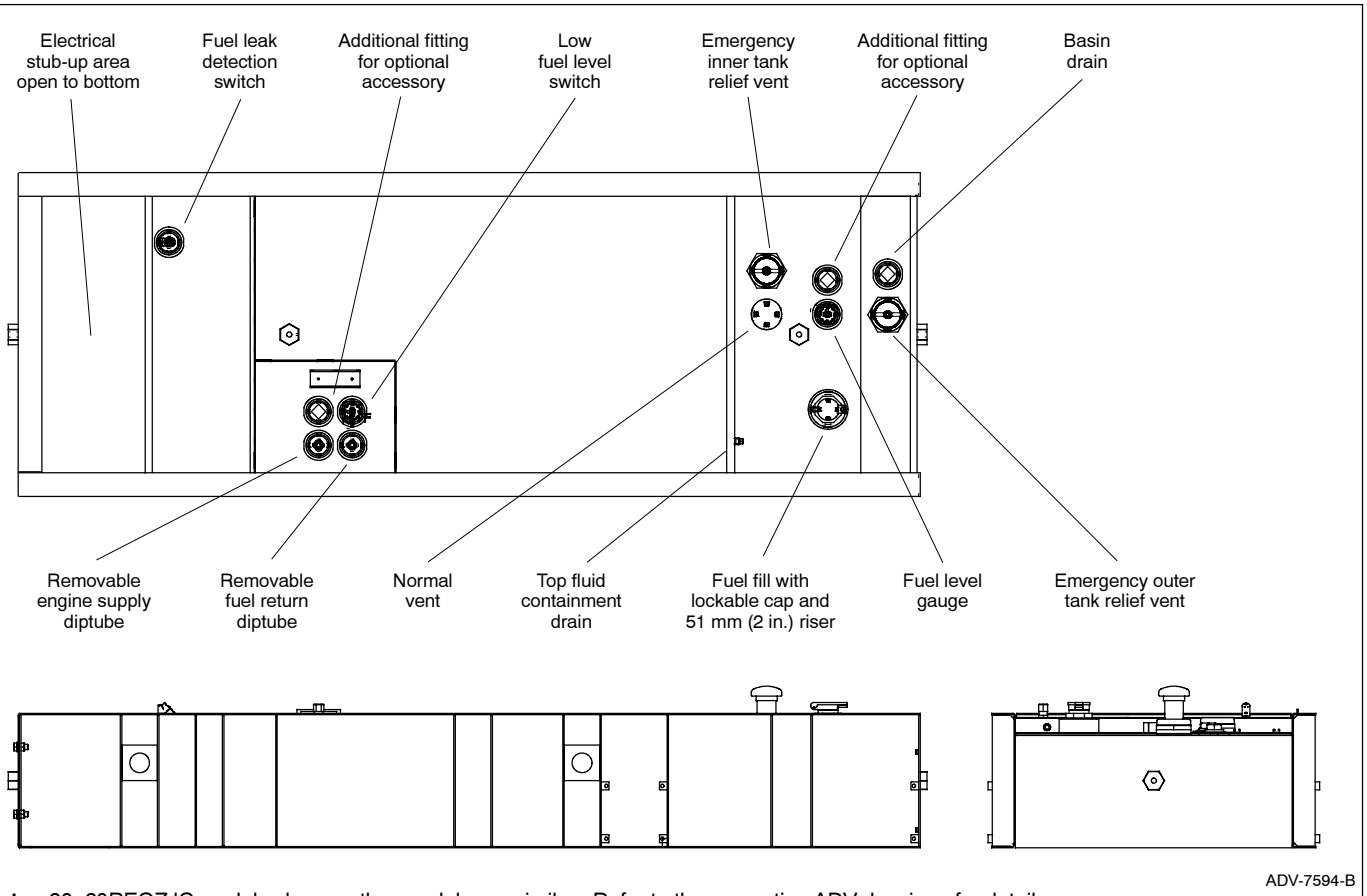


Note: 20–60REOZJC models shown, other models are similar. Refer to the respective ADV drawings for details.

Standard Subbase Fuel Tank Features

- Extended operation. Usable tank capacity offers full load standby operation of up to 72 hours.
- UL listed. Secondary containment generator set base tank meeting UL 142 requirements.
- NFPA compliant. Designed to comply with the installation standards of NFPA 30 and NFPA 37.
- Integral external lift lugs. Enables crane with spreader-bar lifting of the complete package (empty tank, mounted generator set, and enclosure) to ensure safety.
- Emergency pressure relief vents. Vents ensure adequate venting of the inner and outer tank under extreme pressure and/or emergency conditions.
- Normal vent with cap. Vent is raised above lockable fuel fill.
- Low fuel level switch. Annunciates a 50% low fuel level condition at generator set control.
- Leak detection switch. Annunciates a contained primary tank fuel leak condition at generator set control.
- Electrical stub-up.
- State tank designed to comply with the installation standards of the Florida Dept. of Environmental Protection (FDEP) File No. EQ-634.

State Code Subbase Fuel Tank



Note: 20–60REOZJC models shown, other models are similar. Refer to the respective ADV drawings for details.

State Code Subbase Fuel Tank Options

Bottom Clearance/Coating

- ❑ I-beams, provides 106 mm (4.2 in.) of ground clearance
- ❑ Epoxy mastic coating

Fuel in Basin Options

- ❑ Fuel in basin switch, Florida Dept. of Environmental Protection (FDEP) File No. EQ-682 approved

Fuel Fill Options

- ❑ Fill pipe extension to within 152 mm (6 in.) of bottom of fuel tank.
- ❑ 18.9 L (5 gallon) spill containment with 95% shutoff
- ❑ 18.9 L (5 gallon) spill containment
- ❑ 18.9 L (5 gallon) spill containment fill to within 152 mm (6 in.) of bottom of fuel tank
- ❑ 26.5 L (7 gallon) spill containment, Florida Dept. of Environmental Protection (FDEP) File No. EQ-226 approved
- ❑ 26.5 L (7 gallon) spill containment with 95% shutoff, Florida Dept. of Environmental Protection (FDEP) File No. EQ–226 approved

Fuel Supply Options

- ❑ Fire safety valve (installed on fuel supply line)
- ❑ Ball valve (installed on fuel supply line)

High Fuel Level Switch

- ❑ High fuel level switch
- ❑ High fuel level switch, Florida Dept. of Environmental Protection (FDEP) File No. EQ-682 approved

Normal Vent Options

- ❑ 3.7 m (12 ft.) above grade (without spill containment)
- ❑ 3.7 m (12 ft.) above grade (with spill containment)

Tank Marking Options

- ❑ Decal, Combustible Liquids – Keep Fire Away (qty. 2)
- ❑ Decal, NFPA 704 identification (qty. 2)
- ❑ Decal, tank number and safe fuel fill height (qty. 2)
- ❑ Decal, tank number and safe fuel fill height, NFPA 704 identification

Enclosure and Subbase Fuel Tank Specifications

Fuel Tank Capacity, L (gal.)	Est. Fuel Supply Hours at 60 Hz w/Full Load Nominal/Actual	Enclosure and Subbase Fuel Tank					Fuel Tank Height, mm (in.)	Sound Enclosure, Sound Pressure at 7 m (23 ft.), dB(A)
		Max. Dimensions, mm (in.)			Weight, kg (lb.)			
		Length	Width	Height	With Steel Enclosure	With Aluminum Enclosure		
20REOZJC								
Lifting Base	0	2320 (91.3)	1077 (42.4)	1384 (54.6)	943 (2080)	830 (1830)	100 (4)	68
294 (78)	24/41			1671 (65.8)	1272 (2806)*	1159 (2556)*	254 (10)	
427 (113)	36/60			1773 (69.8)	1321 (2913)*	1208 (2663)*	358 (14)	
626 (165)	48/87			1925 (75.8)	1393 (3073)*	1280 (2823)*	508 (20)	
20REOZJC with State Code Fuel Tank†								
442 (116)	24/61	2896 (114)	1040 (40.9)	1671 (65.8)	1362 (3003)*	1249 (2753)*	358 (14)	68
558 (147)	48/77			1849 (72.8)	1459 (3217)*	1346 (2967)*	432 (17)	
960 (253)	72/133			2103 (82.8)	1514 (3338)*	1401 (3088)*	686 (27)	
30REOZJC								
Lifting Base	0	2320 (91.3)	1077 (42.4)	1384 (54.6)	1007 (2220)	894 (1970)	100 (4)	68
294 (78)	24/27			1671 (65.8)	1336 (2946)*	1223 (2696)*	254 (10)	
427 (113)	36/40			1773 (69.8)	1385 (3053)*	1271 (2803)*	358 (14)	
626 (165)	48/59			1925 (75.8)	1457 (3213)*	1344 (2963)*	508 (20)	
30REOZJC with State Code Fuel Tank†								
442 (116)	24/41	2896 (114)	1040 (40.9)	1671 (65.8)	1424 (3139)*	1311 (2889)*	358 (14)	68
558 (147)	48/52			1849 (72.8)	1521 (3353)*	1408 (3103)*	432 (17)	
960 (253)	72/90			2103 (82.8)	1576 (3474)*	1463 (3224)*	686 (27)	
40REOZJC								
Lifting Base	0	2320 (91.3)	1077 (42.4)	1384 (54.6)	966 (2130)	853 (1880)	100 (4)	68
427 (113)	24/33			1773 (69.8)	1344 (2963)*	1231 (2713)*	358 (14)	
626 (165)	48/59			1925 (75.8)	1416 (3123)*	1303 (2873)*	508 (20)	
958 (253)	72/90			2179 (85.8)	1736 (3826)*	1622 (3576)*	762 (30)	
40REOZJC with State Code Fuel Tank†								
442 (116)	24/34	2896 (114)	1040 (40.9)	1671 (65.8)	1451 (3199)*	1338 (2949)*	358 (14)	68
960 (253)	48/74			2103 (82.8)	1575 (3472)*	1462 (3222)*	686 (27)	
1411 (372)	72/109			2332 (91.8)	1726 (3805)*	1613 (3555)*	914 (36)	
50REOZJC and 50REOZJD								
Lifting Base	0	2320 (91.3)	1077 (42.4)	1384 (54.6)	1027 (2265)	914 (2015)	100 (4)	68
427 (113)	24/26			1773 (69.8)	1405 (3098)*	1292 (2848)*	358 (14)	
626 (165)	36/38			1925 (75.8)	1477 (3258)*	1364 (3008)*	508 (20)	
958 (253)	48/58			2179 (85.8)	1736 (3826)*	1622 (3576)*	762 (30)	
50REOZJC and 50REOZJD with State Code Fuel Tank†								
442 (116)	24/27	2896 (114)	1040 (40.9)	1824 (71.8)	1529 (3371)*	1416 (3121)*	358 (14)	68
960 (253)	48/58			2103 (82.8)	1653 (3644)*	1540 (3394)*	686 (27)	
1411 (372)	72/86			2332 (91.8)	1804 (3977)*	1691 (3727)*	914 (36)	
60REOZJC and 60REOZJD								
Lifting Base	0	2320 (91.3)	1077 (42.4)	1384 (54.6)	1164 (2566)	1051 (2316)	100 (4)	68
493 (130)	24/26			1773 (69.8)	1566 (3452)*	1452 (3202)*	406 (16)	
792 (210)	36/42			2052 (80.8)	1687 (3719)*	1574 (3469)*	635 (25)	
958 (253)	48/50			2179 (85.8)	1736 (3826)*	1622 (3576)*	762 (30)	
60REOZJC and 60REOZJD with State Code Fuel Tank†								
558 (147)	24/29	2895 (114)	1040 (40.9)	1849 (72.8)	1616 (3563)*	1503 (3313)*	432 (17)	68
960 (253)	48/50			2103 (82.8)	1767 (3896)*	1654 (3646)*	686 (27)	
1411 (372)	72/74			2332 (91.8)	1918 (4228)*	1805 (3978)*	914 (36)	

Enclosure and Subbase Fuel Tank Specifications (continued)

Fuel Tank Capacity, L (gal.)	Est. Fuel Supply Hours at 60 Hz w/Full Load Nominal/Actual	Enclosure and Subbase Fuel Tank					Fuel Tank Height, mm (in.)	Sound Enclosure, Sound Pressure at 7 m (23 ft.), dB(A)
		Max. Dimensions, mm (in.)			Weight, kg (lb.)			
		Length	Width	Height	With Steel Enclosure	With Aluminum Enclosure		
80REOZJE and 80REOZJF								
Lifting Base	0	2821 (111.1)	1156 (45.5)	1525 (60)	1483 (3269)	1351 (2979)	102 (4)	68
757 (200)	24/29			1880 (74)	1851 (4080)*	1719 (3790)*	457 (18)	
1314 (347)	48/50			2185 (86)	2108 (4647)*	1976 (4357)*	762 (30)	
80REOZJE and 80REOZJF with State Code Fuel Tank†								
815 (215)	24/31	3400 (133.9)	1156 (45.5)	1855 (73)	1996 (4400)*	1864 (4110)*	432 (17)	68
1570 (415)	48/60			2185 (86)	2236 (4929)*	2104 (4639)*	762 (30)	
100REOZJE and 100REOZJF								
Lifting Base	0	2821 (111.1)	1156 (45.5)	1525 (60)	1592 (3510)	1461 (3220)	102 (4)	68
757 (200)	24/24			1880 (74)	1960 (4320)*	1828 (4030)*	457 (18)	
1700 (449)	48/55	3400 (133.9)		2185 (86)	2345 (5170)*	2214 (4880)*	762 (30)	
100REOZJE and 100REOZJF with State Code Fuel Tank†								
815 (215)	24/26	3400 (133.9)	1156 (45.5)	1855 (73)	2105 (4641)*	1974 (4351)*	432 (17)	68
1570 (415)	48/50			2185 (86)	2345 (5170)*	2214 (4880)*	762 (30)	
125REOZJF and 125REOZJG								
Lifting Base	0	3532 (139.0)	1153 (45.4)	1753 (69)	1651 (3632)	1515 (3333)	0 (0)	71
1131 (298)	24/32			2236 (88)	2400 (5280)*	2264 (4981)*	483 (19)	
2207 (583)	48/63			2667 (105)	2751 (6052)*	2615 (5753)*	914 (36)	
125REOZJF and 125REOZJG with State Code Fuel Tank†								
1198 (316)	24/34	4414 (173.8)	1153 (45.4)	2236 (88)	2382 (5240)*	2446 (4941)*	483 (19)	71
2255 (595)	48/65			2591 (102)	2654 (5839)*	2518 (5540)*	838 (33)	
150REOZJE and 150REOZJF								
Lifting Base	0	3532 (139.0)	1153 (45.4)	1753 (69)	1860 (4101)	1724 (3800)	0 (0)	73
1131 (298)	24/25			2236 (88)	2609 (5752)*	2473 (5452)*	483 (19)	
2207 (583)	48/50			2667 (105)	2960 (6526)*	2824 (6226)*	914 (36)	
150REOZJE and 150REOZJF with State Code Fuel Tank†								
1198 (316)	24/27	4414 (173.8)	1153 (45.4)	2236 (88)	2591 (5712)*	2455 (5412)*	483 (19)	73
2255 (595)	48/51			2591 (102)	2890 (6361)*	2727 (6012)*	838 (33)	
180REOZJE and 180REOZJF								
Lifting Base	0	4094 (161.2)	1300 (51.2)	2128 (84)	1928 (4250)	1780 (3925)	0 (0)	72
1514 (400)	24/29			2611 (103)	2861 (6307)*	2713 (5981)*	483 (19)	
2871 (758)	48/56			3017 (119)	3255 (7176)*	3107 (6850)*	889 (35)	
180REOZJE and 180REOZJF with State Code Fuel Tank†								
1576 (416)	24/31	5008 (197.2)	1300 (51.2)	2585 (102)	3162 (6971)*	3014 (6646)*	457 (18)	72
2896 (765)	48/56			2890 (114)	3488 (7690)*	3340 (7363)*	762 (30)	
200REOZJE and 200REOZJF								
Lifting Base	0	4094 (161.2)	1300 (51.2)	2128 (84)	2309 (5090)	2161 (4764)	0 (0)	73
1514 (400)	24/26			2611 (103)	3242 (7147)*	3094 (6821)*	483 (19)	
2871 (758)	48/50			3017 (119)	3636 (8016)*	3488 (7690)*	889 (35)	
200REOZJE and 200REOZJF with State Code Fuel Tank†								
1576 (416)	24/27	5008 (197.2)	1300 (51.2)	2585 (102)	3543 (7811)*	3395 (7485)*	457 (18)	73
2896 (765)	48/50			2890 (114)	4050 (8930)*	3721 (8203)*	762 (30)	

Enclosure and Subbase Fuel Tank Specifications (continued)

Fuel Tank Capacity, L (gal.)	Est. Fuel Supply Hours at 60 Hz w/Full Load Nominal/Actual	Enclosure and Subbase Fuel Tank					Fuel Tank Height, mm (in.)	Sound Enclosure, Sound Pressure at 7 m (23 ft.), dB(A)
		Max. Dimensions, mm (in.)			Weight, kg (lb.)			
		Length	Width	Height	With Steel Enclosure	With Aluminum Enclosure		
230REOZJE								
Lifting Base	0	4121 (162.3)	1338 (52.7)	2157 (84.9)	2654 (5850)	2540 (5600)	0 (0)	75
1787 (472)	24/29			2659 (104.7)	3561 (7850)*	3447 (7600)*	762 (30)	
230REOZJE with State Code Fuel Tank†								
2102 (555)	24/34	5009 (197.2)	1338 (52.7)	2792 (109.9)	3895 (8587)*	3782 (8337)*	635 (25)	75
3573 (944)	48/59	5325 (209.7)		3071 (120.9)	4504 (9930)*	4391 (9680)*	914 (36)	
250REOZJE								
Lifting Base	0	4121 (162.3)	1338 (52.7)	2157 (84.9)	2699 (5950)	2585 (5700)	0 (0)	75
1787 (472)	24/27			2659 (104.7)	3606 (7950)*	3493 (7700)*	762 (30)	
250REOZJE with State Code Fuel Tank†								
2102 (555)	24/32	5009 (197.2)	1338 (52.7)	2792 (109.9)	3940 (8687)*	3827 (8437)*	635 (25)	75
3573 (944)	48/54	5325 (209.7)		3071 (120.9)	4550 (10030)*	4436 (9780)*	914 (36)	
275REOZJE								
Lifting Base	0	4121 (162.3)	1338 (52.7)	2157 (84.9)	2835 (6250)	2722 (6000)	0 (0)	75
1787 (472)	24/24			2659 (104.7)	3742 (8250)*	3629 (8000)*	762 (30)	
275REOZJE with State Code Fuel Tank†								
2102 (555)	24/28	5009 (197.2)	1338 (52.7)	2792 (109.9)	4076 (8987)*	3963 (8737)*	635 (25)	75
3573 (944)	48/48	5325 (209.7)		3071 (120.9)	4686 (10330)*	4572 (10080)*	914 (36)	
300REOZJ								
Lifting Base	0	4121 (162.3)	1338 (52.7)	2157 (84.9)	2835 (6250)	2722 (6000)	0 (0)	75
2070 (546)	24/25			2735 (107.7)	3770 (8311)*	3656 (8061)*	838 (33)	
300REOZJ with State Code Fuel Tank†								
2102 (555)	24/25	5009 (197.2)	1338 (52.7)	2792 (109.9)	4076 (8987)*	3963 (8737)*	635 (25)	75
4066(1074)	48/48	5588 (220.0)		3071 (120.9)	4644 (10238)*	4530 (9988)*	914 (36)	

Note: Refer to the respective ADV drawings for details.

***** Weight includes the generator set (wet), enclosure, silencer, and tank (no fuel).

† State code fuel tank specifications (height and weight) include I-beam option.

The generator set weight represents using the largest alternator option. The enclosure weight is with acoustic insulation added.

ATTACHMENT C

NELLIS SOLAR POWER PLANT NOISE
MEASUREMENTS (Array Trackers)

13 September 2010

8minutenergy Renewables LLC
142 S. Hayworth Ave
Los Angeles, CA 90048

Attention: Mr. Tom Buttgenbach, President

Subject: Nellis Solar Power Plant
Acoustical Measurements
JBA Project No. 10.0369.Z

Dear Mr. Buttgenbach:

We visited the Nellis Solar Power Plant today. Due to security, we were no able to record acoustical measurements within the facility, but were able to record measurements from just outside the North gate, which is approximately 100' from the nearest solar panel tracker.

We measured a sound level of 39dBA with a number of SunPower trackers moving. This level includes the sound of the trackers and other uncontrollable background noises such as aircraft, vehicular traffic, birds chirping and an adjacent rendering facility. As the total noise level is less than 45dBA we know that the noise due to the trackers alone will be less than 45dBA at 100' distance.

Based on this measurement we can state that the noise level associated with trackers such as the SunPower or similarly actuated trackers will be less than the 45dBA at a distance of 100' or more.

Sincerely,

JBA CONSULTING ENGINEERS

Michael A. Schwob, PE, INCE
Director of Technology Services,
Senior Acoustical Engineer

MAS\hb